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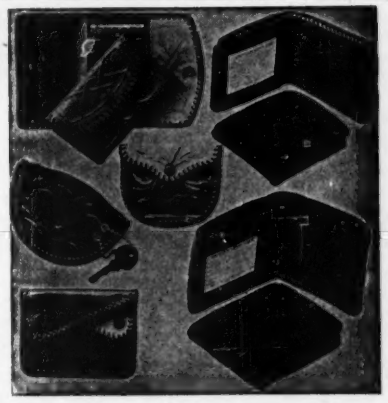

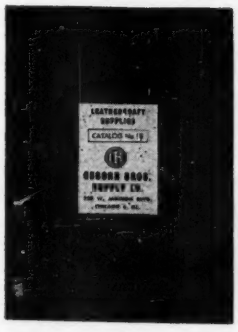

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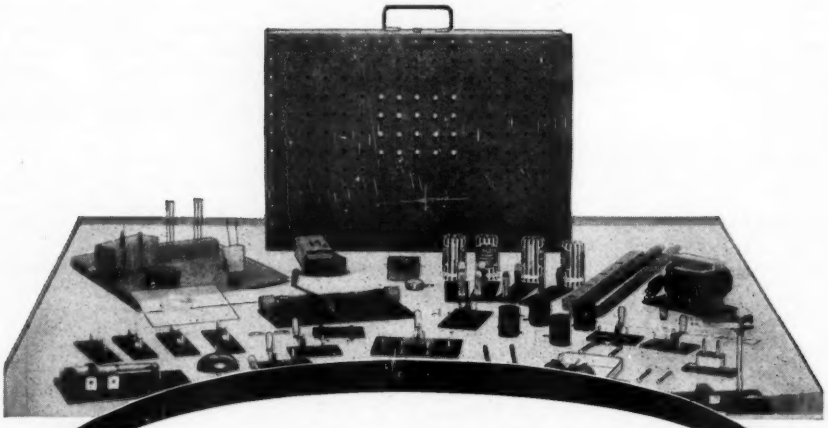

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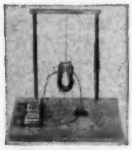

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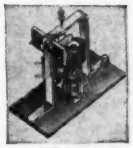

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THE ROLE OF THE OCCUPATIONAL THERAPIST IN THE RE-EDUCATION OF APHASIA PATIENTS*

PART I†

MYRA McDANIEL, Major, WMSC

Aphasia is a disturbance of language formulation which is not due to blindness, deafness, paralysis of the arm or tongue, or general mental deficiency.[1] This disturbance of language function may affect singly or in combination, the individual's ability to read, speak, write, or understand. Aphasia results from brain injury, the causal factors including neoplasms, trauma, cerebrovascular accidents, and disease.

Early treatment for the language disturbances is indicated throughout the literature. There are not sufficient speech therapists or language retraining therapists available for the increasing numbers of brain-injured individuals. To assure the maximal return of language function it is suggested that language reeducation could be done by the occupational therapist in the absence of trained speech personnel.

It was the purpose of this study to (1) review the nonlanguage and language disorders common to aphasia that would contribute to a basic understanding of the personality, the psychological difficulties, and the physical disabilities of the aphasic individual; (2) suggest a fundamental reeducation program which would incorporate the principles of speech training; such program to be directed by occupational therapists in the absence of speech personnel; (3) review the basic principles of treatment of aphasic individuals and suggest reinforcement techniques that could be utilized in a supportive occupational therapy program; such program to incorporate those principles and utilize to the utmost the speech progression made by the aphasic.

The inability to communicate thoughts, needs and desires is damaging to any ego. The frustration caused by a lack of communicative ability is intensified in the aphasic individual who is mentally competent. Some bridge of communication must be begun after the acute stage of the disease and/or injury process has subsided for the mental well-being of the aphasic individual. The occupational therapist has little or no background in speech retraining but could give encouragement and needed assistance to the aphasic if basic principles were outlined in an understandable manner for a reeducation program. More adequate support could be given to an active speech program if the principles and procedures underlying that program were interpreted on an individual patient basis.

In the reeducation program this study was limited to speech retraining procedures utilized in the various categories of aphasic difficulties: the agnosias, apraxias and aphasias. This study did not encompass the physical disabilities such as hemiplegia, seizures, etcetera, as these aspects of aphasia have been covered in preceding studies. The supportive program was limited to those reinforcement techniques that could be used to maintain and assist speech progression.

Data for this study were obtained from several sources: (1) material related to the subject, (2) clinical observations of and interviews with those who work with aphasic individuals, and (3) the personal observations of the author.

Materials pertinent to the study of aphasia were reviewed in order that the investigator would become familiar with the problems of the aphasic individual and the significance of early speech

*An abstract of a paper presented to the department of occupational therapy at the University of Southern California in partial fulfillment of the requirements of a Master's degree.

†This is the first part of a three-installment article. The next section will appear in the Jan.-Feb. issue, 1955.

training. In an effort to assemble as much information as possible concerning aphasia and the reeducation of aphasia patients, interviews with persons familiar with the total problem were held, and their clinical observations noted. Mrs. Aleen Agranowitz, chief of the aphasia section of Veterans Administration Hospital, Long Beach, California, was interviewed concerning the total treatment approach to the aphasic individual. At this same hospital, J. M. Nielsen, M.D., national consultant in aphasia, Veterans Administration, was observed many times as he made initial and follow-up examinations of aphasic individuals. Observations were made of speech therapy treatments given by therapists Daniel Boone, Marian Ruff, and Gloria Seacat, all of Veterans Administration Hospital, Long Beach, California. Occupational therapists Alice Cooley, Janet Stone and Elaine Mapes, also of Veterans Administration Hospital, Long Beach, were observed and interviewed for special techniques and practices found valuable in working with aphasic individuals.

The author worked with aphasic patients in the occupational therapy section of Veterans Administration Hospital, Long Beach. In this way opportunity was presented to become acquainted with the over-all problems of the aphasic patients.

APHASIC DISORDERS: NONLANGUAGE AND LANGUAGE

The occupational therapist must be fully aware of the generalized problems of the aphasic individual before any treatment program is contemplated. These problems can be categorized as either nonlanguage or language difficulties.

NONLANGUAGE DIFFICULTIES

A listing of the most frequently observed behavior manifestations of aphasic individuals has been done by Wepman.[2] This list is included because of the significance of these nonlanguage deviations on the personality of the aphasic individual. Only a few of these may be observed in the individual aphasic.

1. Loss of attention and concentration
2. Loss of memory
3. Reduced association of ideas
4. Abstract-concrete imbalance (loss of ability to abstract; concrete concept formation)
5. Poor organizing ability
6. Poor judgment
7. Perseveration
8. Constriction of thought and interest
9. Reduced ability to generalize, categorize, group, or plan future action
10. Reduced general level of intelligence
11. Reduced ability to inhibit emotional forces which disturb the action of the intellect (Halstead's "power factor")
12. Inability to shift
13. Psychomotor retardation
14. Feelings of inadequacy
15. Egocentricity
16. Increased irritability and fatigability
17. Euphoria
18. Social withdrawal and seclusiveness
19. Reduced ability to adjust to new situations
20. Catastrophic reactions
21. Reduced initiative
22. Disinterest in the environment, both physical and human
23. Externalization of behavior; a lack of introspection or self-criticism
24. Reduced spontaneity
25. Perplexity (a distrust of one's own ability)
26. Automatic verbalization
27. Impulsive behavior
28. Regressive infantile behavior
29. Impotence (the inability to correct behavior one knows is wrong)
30. Post-traumatic psychotic behavior showing illusions, hallucinations, delusions, and extravagant behavior
31. Anxiety and tension
32. Convulsive seizures
33. Changing personality profile, the emergence and submergence of characteristics
34. Hemiplegia

The term catastrophic reaction (item 20) was formulated by Goldstein[3] to describe the aphasic individual whose entire behavior is changed when confronted with a frustrating experience.

The most common physical disabilities of the aphasic individual include convulsive seizures, hemianopsia, facial paralyses and hemiplegia. The prognosis for the functional return of the hemiplegic arm is dependent upon the severity of the brain damage. Complete or partial recovery is attained by some aphasic individuals. The majority of authors agree, however, that training in writing and other activities should be initiated with the non-affected hand at the same time as the other reeducation processes are begun.

LANGUAGE DIFFICULTIES

"All of our hope in retraining the aphasics depends on the functional capacity of the minor cerebral hemisphere."[4] Nielsen has demonstrated by combination of case history and autopsy that it is the minor cerebral hemisphere which takes over the functions of the damaged major hemisphere. The minor hemisphere is in a more or less dormant readiness state until injury to the major hemisphere necessitates its being utilized. Some aphasics recover their speech spontaneously at the termination of the acute phase of their injury. Wepman feels that training should be started for every aphasic adult as soon as possible after injury, that it is not an error to begin training on those who may recover their speech spontaneously.[5] The training helps bridge the psychological gap of being unable to communicate.

The language manifestations of the aphasic individual may include one or a combination of the following classifications. These can be differentiated into receptive (agnosias) and expressive (apraxias and aphasias) types dependent upon the difficulty which the patient is experiencing.

Three major types of agnosia can be differentiated: visual agnosia, auditory agnosia, and tactile agnosia. *VISUAL AGNOSIA.* Visual agnosia is the inability to recognize objects presented visually. This can include recognition of letters, words, pictures, colors, numbers, musical notes, geometric forms, etcetera. There are sub-varieties of this type in which the individual can read letters but not words; letters and/or words but not syllables; or words and not letters.[6] The inability to recognize color can be differentiated from color blindness.

AUDITORY AGNOSIA. Auditory agnosia is the inability to recognize and comprehend the spoken word. There is no defect in the hearing mechanism, it is just that the association pathways between what is heard and the sorting out or understanding of the sound are affected.

TACTILE AGNOSIA. Tactile agnosia is the inability to recognize objects or forms by touch. This is more commonly called astereognosis.

Apraxia is the inability to perform a voluntary activity or to perform upon request. The apractic individual is not paralyzed. Of the many types of apraxia described in the literature, two basic groups can be differentiated as the verbal and nonverbal types.

VERBAL APRAXIA. Verbal apraxia manifests itself as an inability to produce words. There is an inability to express in verbal language ideas which the individual possesses. This form of apraxia so closely approximates a motor aphasic defect that many neurologists classify it with motor aphasia.

NONVERBAL APRAXIA. Three types of nonverbal apraxia are generally recognized: kinetic, ideokinetic, and ideational. Kinetic apraxia is weakness of associated musculature. Voluntary motion is present but there is loss of dexterity and no deliberate, purposeful motion can be performed. In ideokinetic apraxia there is a correct formulation of ideas but the plan fails to reach the motor mechanism. Simple movements, spontaneous and automatic, can be performed but complex voluntary or imitative movements cannot be done upon request. Ideational apraxia can be compared with extreme absent mindedness. Any movement can be made correctly but the individual has forgotten the intention of the movement. Agraphia, the motor inability to write, is also included in the nonverbal apractic classification.

The aphasias include motor aphasia, sensory aphasia, anomia, paraphasia and acalculia.

MOTOR APHASIA. (Apractic aphasia). Motor aphasia is the complete or nearly complete loss of ability to produce motor speech due to a lesion which disrupts motor speech patterns. This condition is rarely found alone, there is usually loss of function in other areas.

SENSORY APHASIA. Sensory aphasia is the inability to recognize or comprehend spoken language. In much of the current terminology this is classified as agnosia and will be included with such in the following discussions.

ANOMIA. Anomia is the inability to find words with which to express ideas or thoughts. In the mildest form the individual merely fails to recall proper nouns. Such an individual may know that the object with which he is confronted is "to write with" but cannot say "pen," a chair is "what you sit on." This individual comprehends what is said and recognizes objects, he is merely unable to name them. In severe cases recall is lost for verbs, adjectives and possibly all parts of speech.

PARAPHASIA. Paraphasia is the use of wrong words, errors in syntax or telegraphic speech (the omission of nonuseful words). It may result from a defect in language formulation or from an auditory agnosia, in which event the individual, because he is unable to hear the errors in his speech, is unaware of them.

Very few aphasic individuals can be isolated as a specific agnostic, apractic, or aphasic. Usually there is a combination of difficulties present from each classification. It is of primary importance, when treating the aphasic individual, that the occupational therapist recognize and understand the nonlanguage and language difficulties confronting the patient and their resultant physical, psychological and personality effects.

REEDUCATION PROGRAM

The purpose of this section is to demonstrate the role of the occupational therapist in the speech reeducation of aphasic individuals when no trained speech personnel are available. Occupational therapy for the aphasic individual, as for any other individual, is prescribed by a physician. The neurological examination given the aphasic will determine the quality of his perception, recognition, recall, comprehension, formulation and performance. The examinations are of a practical nature and test the aphasic in both oral and written material. For further information regarding the neurological examinations, the reader is referred to selected pages in Nielsen,[7] Wechsler,[8] Goldstein[9] and DeJong.[10]

Essential to any treatment program for an aphasic individual is rapport between the patient and the therapist. The aphasic needs more than psychological ease and freedom. There must be real understanding of his physiological and anatomical problems.

The success of the reeducation program will depend not only upon the interest and sincerity of the therapist but also upon the aphasic's desire to recover. The therapist must not expect the aphasic

(*Continued on page 275*)

DOES OCCUPATIONAL THERAPY MEET THE DEMANDS OF TOTAL REHABILITATION?

EDWARD E. GORDON, M.D.*
THELMA L. WELLERSON, M.A., O.T.R.†

Occupational therapy, born as a war baby during World War I, has had many years to mature, yet the question arises whether she has come of age. She often serves as one of the handmaidens to medicine; at other times she works alone without any seeming relationship to the great family of medicine. Some workers in the medical field question whether she is indeed a true member of the family.[1, 2, 3] Such rejection stems from the feeling that she offers no real contribution in the management of the sick and disabled.

What lies at the base of this rejection? In the medical field it appears to be due partly to the failure in providing specific functional training, partly to the lack of any objective evidence for evaluating the progress of treatment, and partly to the apparent irrelevancy of operations utilized in occupational therapy for the needs of the patient. Objections stem from other quarters, too. Frequently, male patients are hostile because they cannot accept what to them appears to be "women's work." The hospital administrator, concerned with budgetary problems, regards occupational therapy as only another unwanted mouth to feed. Even though some of these objections may not be valid, it behooves those directly concerned to reconsider the role and contributions of occupational therapy from all these points of view. A service comes into being because of a demand; but to survive, growth must take place from within. Like Alice in "Through the Looking Glass," one must run in order to remain in the same place.

The purpose of this paper is to examine these objections, assess the shortcomings of occupational therapy, and suggest how these may be corrected. It is necessary at the outset to state that these considerations apply to the place of occupational therapy within the framework of rehabilitation of primarily physically disabled adults. We are not concerned herein with the management of patients in psychiatric institutions or with children; these constitute special problems. We are directing our attention to patients with orthopedic and neurological handicaps, and with chronic medical conditions, such as tuberculosis, emphysema and cardiac disease.

Since we are concerned with the service of occupational therapy to rehabilitation, it is also necessary to define rehabilitation. It is generally agreed that its province extends not only to the physical aspects, but equally to the vocational and psychological needs of the patient. Therefore, all therapy should be directed consciously toward this triad (the physical, vocational and psychological factors of disability) as the only adequate objective, and not toward functional training alone.

That concept is limited which sub-divides therapy into isolated categories (functional, prevocational and the like). For all the demands of rehabilitation must be integrated into a single goal to restore a disabled individual to his appropriate social setting. It follows that the type of work therapy chosen must satisfy the functional, psychological and vocational requirements of the situation. When vocational goals are not particularly applicable, then at least the medium should conform to the patient's own interests or work habits. If the chosen medium of work satisfies merely the functional requisites of the disability, the patient may reject it on psychological grounds because it does not conform to his acquired work habits. In this instance, the prescription may fall short of reaching the therapeutic goal. Moreover, it is open to question whether any type of task which appears to have all the functional ingredients will necessarily have a carry-over into another activity relevant to the patient's vocational background. While strength and motion may at the moment increase, skill and coordination for future use may remain unaffected. Training involves not only muscles but establishing specific motor patterns centrally. One does not have to belabor this point. It is sufficient to indicate that a person with adequate musculature and joint mobility cannot play tennis with proper form without specific training in it. It would appear, then, that a modality is ill-chosen for the job of complete rehabilitation if it is not vocationally directed and related to the interests of the patient. The uncritical and routine reliance upon arts and crafts, in our opinion, is open to such an error.

These concepts contain the crux of the objection arising from the use of modalities irrelevant to the needs of the patient. Before elaborating this point of view, it may be appropriate to examine those objections raised unjustly against occupational therapy by workers in the medical field. In the first place, the criticism has been made that occupational therapy does not perform a useful function. It is true in some instances that patients in an acute hospital have been reduced to a form of

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"captive audience" by occupational therapy. Convalescing from an acute, self-limited disease and awaiting their freedom, patients often accept the work proffered them only to oblige the therapist. Indeed, they rarely have need for this except as an escape from the boredom of a sheltered existence; even then the patients often express a preference for reading or enjoying radio or television. As these activities already "occupy" such patients in an appropriate manner, why is it necessary to resort to any further prescription and utilize valuable therapists' time? Another instance in which occupational therapy may be unjustly discredited is that in which functional improvement is beyond help from muscle training. A patient with ankylosis of the finger joints is a case in point. Such a diagnosis would preclude the prescription of occupational therapy. Failure to achieve results here is due to the lack of a consideration of the underlying pathology, not to an inherently impotent technique. The charge of uselessness, then, is unwarranted because in these instances it is not so much that occupational therapy is useless as misused.

Criticism is heard that progress cannot be objectively evaluated by occupational therapy. It is true that integrated function of the extremities does not lend itself to precise quantitative measurements. However, the possibility of assessing the patient's progress in terms of objective data does exist. There are several tests of functional capacity that are available. One such is the score of activities of daily living. By recording performance at intervals, either graphically or in a table, trends can be readily observed in the ability of the patient to carry out numerous tasks involving integrated motor activity. Another form of objective measurement can be obtained by recording the rate of performance in executing any particular piece of work. Another test consists of measuring power of grasp by squeezing on a bulb against a column of mercury or a spring gauge. Recording joint range of motion may also be useful. No attempt is made here to present an exhaustive series of functional tests, but it is possible to point out that measuring sticks are available. However, they must be adapted to the particular situation and are accessible with a little ingenuity on the part of the therapist. Admittedly, each test yields only a small fragment of the total picture; to increase the value of functional testing, a battery of tests rather than a single one should be applied to estimate progress. In this connection, a therapist addicted only to a goniometer does not supply much worth-while information.

Turning to the administrative objections, the cost of maintaining an occupational therapy department is, of course, not to be dismissed lightly. Perhaps in an acute hospital where the average length of stay is short and where vocational rehabilitation is not a problem, the support of such a department may not be justified in the light of rising costs. It may be the wiser decision for occupational therapy to withdraw from this field and concentrate in centers where long-term rehabilitation is essential. However, there are many acute hospitals where occupational therapy is called upon to serve the disabled on the ward and in the clinic. While the administrator recognizes the value of rehabilitation, as evidenced by the fact that many such hospitals have established departments of physical medicine, he may not be convinced that occupational therapy is a necessary component. He must be shown that such a service is a valuable tool. This can only be accomplished by demonstrating that integrated exercise with maximal motivation through properly orientated therapy, in the long run, accrues to the best interests of the patient and the community.

We now come to the expressions of dissatisfaction with occupational therapy on the part of patients. Many male patients, outraged by working at arts and crafts, fail to see its value. Even that sex in whose domain the arts and crafts are supposed to lie, sometimes react similarly. These sentiments cannot be disregarded. While simple exercises are readily accepted because the patient understands their intent, therapy through work must have more than a mere physical meaning. This is because the latter involves not only the motor capacity of the patient but also his personality, attitudes, habits and intelligence. He constantly directs his attention towards some purposeful goal by putting his mind as well as his body to the task. Motivation is just as important as motor function.

The sentiments that these patients express against occupational therapy are valid and really touch upon the crux of the problem. The shortcomings of this discipline are not the lack of objective measurements, the high costs, the unwarranted prescriptions, but rather the use of modalities unrelated to the patients' sense of values. This opinion brings us to the question heretofore raised. Does the routine use of classical media, viz., arts and crafts, satisfy the needs of rehabilitation in an industrial society? One of the strongest criticisms against occupational therapy, and one which also accounts for much dissatisfaction on the part of the disabled, is the uncritical use of arts and crafts, media which are out of all relation to the vocational demands of contemporary life.[3] This feeling may also explain the growing importance of rehabilitation workers at the peripheral areas of occupational therapy, and their increasing pressure to replace what they regard as paleolithic tools with comtemporary ones. It is true that the modalities upon which occupational therapy

leans heavily read like a Fourteenth Century category of trades rather than a compilation of Twentieth Century industries. This statement can be documented by the following list, published in 1947, of occupational therapy media used in all types of hospitals.[4] In order of frequency of use they are:

1. Leather Work
2. Cord Knotting
3. Wood Working
4. Weaving
5. Knitting & Crocheting
6. Drawing
7. Stencilling
8. Making Stuffed Toys
9. Braiding
10. Stitching
11. Painting (Water Colors)

A more recent list, published in 1952, is on the whole very similar.[5]

1. Woodworking
2. Sewing and Needlework
3. Weaving
4. Leather Work
5. Recreation
6. Decorative & Fine Art
7. Self-Help Activities

In order to ascertain whether these training facilities bear any relationship to industry in this country today, the following list of major manufacturing occupations procured from the last available recorded census (1940) is presented in order of importance.[6]

1. Iron and Steel
2. Food
3. Machinery
4. Textiles
5. Apparel
6. Automobile
7. Electric Machinery
8. Lumber
9. Chemicals
10. Printing & Publishing
11. Transportation
12. Equipment
13. Furniture

Semi-professional occupations ranged in the following order:

1. Drafting
2. Laboratory Technicians
3. Morticians
4. Religious Workers
5. Photographers
6. Designers
7. Sports Instructors
8. Medical Service Workers
9. Surveyors
10. Dancers
11. Radio Operators

It is hardly necessary to point out the obvious discrepancy between the types of work in occupational therapy and those in industry. We are aware of the fact that the compilation of work media leans heavily toward arts and crafts because many psychiatric and tuberculosis hospitals were included in the census. But this is precisely our point: too great reliance on the arts and crafts. At least in the latter type of sanatoria, where often vocational goals are quite relevant, patients should be exposed to modern tools.

It is apparent that many of these occupations involve machinery and the use of scientific techniques. Although not all of them are applicable to patients undergoing rehabilitation, if interest is to be provided and if the ultimate goal of productive employment is to be realized, classical arts and crafts must often yield first place to modern industrial media as training tools in occupational therapy. These modalities not only can provide functional value but may be more acceptable to many patients and conform, in general, to ultimate vocational goals. Such a program also avoids exercise for exercise's sake alone, and stimulates the development of work habits. If occupational therapy is to improve its service to rehabilitation, it must utilize industrial media as freely as arts and crafts and select the proper task from its armamentarium thus augmented. This is not to say that arts and crafts are to be replaced. They should be used, not routinely, but only when consistent with the vocational, psychological and functional demands of the case. In other words, choice of therapeutic media should be directed by the following dictum expressed by Kidner:[7] ". . . if several varieties of occupation . . . would have equal value for therapeutic purposes, but one was more valuable than the others . . . for a definite occupation, that one would be prescribed."

It is to be emphasized that the use of modern occupations is not for the purpose of training a patient for a vocation. We feel that he can more readily accept those media, exploited primarily for functional exercise and prevocational training, which are in keeping with his own sense of work.

To be specific, what additional tasks then may be made available in the workroom? Power tools for wood and metal, and these have been installed in many occupational therapy clinics. Sheet metal work is readily adaptable for strengthening muscles and increasing joint motion. Pipe fitting is also suitable for the same purpose. Radio assembly work provides exercise for coordination and dexterity. Electrical wiring is excellent for hand coordination where resistance is required. It is also suggested that there be available tools and materials to simulate realistic work conditions for patients temporarily disabled in order to determine whether they can return to work.[8] For example, a laborer recovering from a low back injury can be made to shovel gravel for progressively increasing periods of time as a therapeutic exercise and test. A man may also move crates off a platform or push a wheelbarrow with a graded load. Brick laying may also serve the same purpose.

The occupational therapist may refer to excellent job description pamphlets for development of additional modalities. The Bureau of Manpower Utilization, War Manpower Commission, Washington, D. C., has published job analyses of many trades including necessary equipment, work performance, physical demands, and other pertinent details.

Where acquisition of a trade is not necessary, as in the case of a housewife, occupational therapy can be adapted to her needs at home. Time-sav-

(*Continued on page 275*)

LATERALITY OF UPPER EXTREMITY FUNCTION IN PHYSICALLY HANDICAPPED CHILDREN*

ANTJE PRICE, O.T.R.

STATEMENT OF BASIC CONCEPT

It seems to be a fundamental weakness of human nature that the more obscure and controversial a subject is, the more firmly it is supported by a strong and irrefutable body of hearsay evidence. Laterality, or more simply, handedness and all its ramifications, qualifies admirably for this distinction because it is a universal human trait—everybody has it and everybody is an expert on it, because it has some interesting and baffling interrelations with other basic human functions, especially language, and because it is primarily an expression of the central nervous system, the most complex and enigmatic portion of the human anatomy. Fortunately there is a great body of conscientious research, as well as one of hearsay, and although here again we find much controversy and disagreement, there is a discernible progression toward a supportable concept.

In handicapped children, especially those with dysfunction of the central nervous system classed as cerebral palsy, laterality seems to have a more consequential role than in normal children; however few studies have been made in this area. It is the purpose of this study to investigate and define laterality problems and their effects in physically handicapped children and to do so in terms of upper extremity function. The subject is being considered from this point of view because it is in this area that the occupational therapist is confronted with the problems of laterality and must evolve solutions. Furthermore, an occupational therapist, by virtue of training, experience and orientation, may be considered an expert on arm and hand function. Language and eye laterality, the technical aspects of which are not primarily within the scope of occupational therapy, will be discussed only as they relate to the basic concept.

Definition

Laterality may be defined as the functional superiority and preferential use of one of a set of paired structures. It presupposes the existence of two matched anatomical areas such as the arms, one of which takes the *major* and the other the *minor* role in voluntary activity.[1, 2] The term "dominance" will not be used here because it implies an erroneous relationship between the parts and because it is burdened with too many connotations in other disciplines, notably the field of genetics where discussions on the dominance of dominance abound.

Laterality is the expression of a basic functional asymmetry, which only man develops to an appreciable degree, and which has been said to be the key to the acquisition of fine skills.[3, 4, 5] These encompass manipulative activities for the hands, sighting and direction sense for the eyes, and the whole complex mechanism of language, including speech and writing. Skills cannot be considered perfected until they have become automatic, efficient and precise, and they become this way, like all motor learning, through constant, consistent practice using the same muscular mechanism in the same way until the activity becomes a habit.[7, 8] These very complicated skilled coordinations cannot easily be learned by two structures at the same time; one must take the lead. This is not merely a matter of motor innervation but primarily one of the sensory impulses returning to the brain from the moving part and eventually building up a complete pattern for motion. The development of two patterns of motion would be incompatible, rendering the fine functions uncontrollable.

The eye and the hand demonstrate a characteristic that is of vital consideration in the study of laterality: although each is paired and structurally similar, each hand or eye is a mirror image of the other and the musculature that moves one of each pair in one direction (e.g. to the right as in writing) represents the antagonists of the muscles that must move the other unit in the same direction.

Cerebral Laterality

There is no longer any question that this basic asymmetry is of cerebral origin; that is, that the preferential selection of the major structures is initiated and developed in the cerebral cortex. Studies in human beings over the last fifty years on aphasia, on focal epilepsy and more recently with electrocorticography of the living cortex, as well as research with rats, have provided the greatest body of evidence.[9, 10, 11, 12, 13, 14, 15] The role of other portions of the central nervous system, such as the subcortex, commissural system and the cerebellum, has been more difficult to define. By nature of their location they cannot easily be exposed for investigation in the living brain. Furthermore they do not submit to localization of distinct areas since they are largely integrative structures, and discrete lesions that do not affect total functioning are rare. Studies in this area that have been successful have been unable to ascribe any direct participation of these structures and of the peripheral

*A paper by the same title was presented at the 1953 institute held at the AOTA conference in Houston, Texas. This paper was a preliminary report of only one phase (cerebral palsied) of the whole study (physically handicapped) which the author has conducted during the past five years.

nervous system in laterality, except in the transmission of sensation and impulses to and from the cortex,[16, 17, 18]

The relationship of the two hemispheres has been described as similar to that of pilot and co-pilot.[11] The pilot, qualified and selected for the major role, takes over all the responsibility and becomes more and more proficient while the co-pilot misses the opportunities for training. Should the pilot be incapacitated, the co-pilot may take over provided he is in good condition and the vehicle not too old. The minor elaboration areas will have to be developed by training and practice as the major ones originally were and will have to build up the stamina to function continuously. Whether all functions are transferred *in toto* to the minor hemisphere, or only those involved in a discrete lesion or selective training, has not been definitely established. There is some evidence for both sides.[7, 11, 13, 21, 30]

Handedness

Handedness, or asymmetry as it affects arm and hand function, is the most overt manifestation of laterality. The sensori-motor representations for each arm are located around the Rolandic fissure of the contralateral hemisphere. Electrical stimulation of this area in the living brain does produce a simple muscular contraction and kinesthetic sensation, but not the degree of cordinated action we describe as movement. Injury here produces varying degrees of paralysis and impairment of muscle sense, but not necessarily a loss of previously developed motion patterns.[12] There must be other centers, or elaboration areas, whose function it is to assimilate kinesthetic, tactile and visual impulses into action patterns and to organize and implement these movements when voluntary motion is demanded. The exact location, number and size of such areas, and the extent to which they function unilaterally, has not been definitely established. This is due in part to the fact that association areas of this sort are silent in response to electrical stimulation unless they are in use—unless a voluntary skilled act is being performed at the moment of stimulation. Furthermore information on arm and hand use and specific disability which could be coordinated with autopsy findings has often been inadequate. Certain pathological findings in the nature of apraxias and agnosias,[7, 9, 11] as well as the fact that we unquestionably exhibit laterality of upper extremity function, tend to support the view that these skill elaboration areas may function unilaterally. These principles apply to the whole motorium of the human body, but the phenomenon of laterality is limited by and large to the upper extremities because the trunk and legs as a rule do not, and do not need to, develop differential unilateral skills.

Information about the tests, scoring procedures and detailed instructions necessary for administration of the battery of tests can be obtained from Miss Antie Price, O.T.R., 509 West Oakdale, Chicago 14, Illinois.

Language

Two other complex functions concerned and associated with manipulative ability, and like it found only in man, are usually lateralized by the major hemisphere. The first of these is language. Vocalization and articulation areas have been located in the cortex and these are active bilaterally; in addition, elaboration areas have been defined in the frontal (Broca's area), parietal and temporal regions, each with their fairly well circumscribed associative duties. These have been found to be active unilaterally, generally on the major side as indicated by handedness.[12] Injury to such an elaboration area on the major side usually produces aphasia.[13, 19, 20, 21]

In any discussion on laterality and language the question of stuttering is bound to arise. Much of the impetus for investigation and the interest in laterality during the second quarter of this century was provided by the discovery that there appeared to be variously more left-handedness, more ambidexterity or more transfer of handedness in groups of stutterers than in normal groups.[5, 22, 23, 24, 25] Many of the early theories and most of the testing procedures were developed by researchers investigating this phenomenon. At the present time laterality abnormality is no longer cited as a causative factor in stuttering after many unsuccessful efforts to prove it the *sole* cause. Rather stuttering and handedness difficulties, as well as behavior problems, if they happen to coincide in the same individual, are now often considered the result of another variety of dominance: the domineering parent.[5, 26] This is the parent who tends to prescribe very high standards to which the child must conform without much regard for his individuality. Thus pressure and sometimes punishment is applied to insure that he is right-handed, and he is criticized for uneven and imperfect speech even during the formative era of language development when this is to be expected. All this, in conjunction with countless other pressures applied by the parents, tends to produce a very diffident and insecure child who stutters, who may have reading difficulties and who shows behavior problems.

Eyedness

As in language there is an element of unilaterality in vision. Sight itself is bilateral, one half of each retina being served by each hemisphere. Sighting, however, or the visual fusion necessary for three-dimensional vision and development of directional sense, is determined unilaterally. The major eye has been described as voluntarily assuming the

correct position to obtain the desired field of vision, whereas the minor eye accommodates to it to obtain visual fusion by a separate, automatic, reflex mechanism.[1, 27]

All three of these complex functions—hand skill, language and visual fusion—find their culmination in man's most intricate activity: writing. It may be said that laterality develops primarily to make this skill feasible, and also that most laterality problems locate around this focus. It must be borne in mind that, although in normal man *one* hemisphere usually assumes the major role in *all* of these functions, this is not always and not necessarily so. About 5% of the aphasics studied demonstrated lesions in the minor hemisphere[13, 28] and in 20-66% of various groups under consideration the major eye was not on the same side as the major hand.[4, 29]

The Genesis of Laterality

What then determines the major hemisphere? Laterality is considered an *acquired* skill that develops on a specific side and to a certain degree as the result of a predisposing *hereditary* factor. Two aspects seem evident in the determination of a major side: (1) the degree of laterality, and (2) the actual choice of side. These factors are congenital and considered by most students of the subject to be hereditary.[8, 11, 31, 32] Just how they are inherited and whether right-handedness is really a Mendelian dominant trait is open to question, however. In the general population about 90% are right-handed and 10% left-handed.[8, 10, 33] The larger group is made up not only of those who were inherently right-handed, with all degrees of laterality, but also those who were left-handed with a weaker degree of laterality but became right-handed because social pressure is all toward the right. The remaining 10% are the inherently strongly left-handed. There is, of course, nothing physiologically or neurologically wrong with being left-handed except that one is in the minority.

The tendency to prefer one specific side to a certain degree is present at birth and, according to some, can be predicted in the tonic neck reflex, a normal characteristic of postnatal posture.[34, 33] The reflex is bilateral but the head is usually turned more frequently to the side that will eventually take the lead in laterality. However laterality as such has not been established because it is expressed in terms of learned skill which of course the newborn does not possess. As the child and his neuromuscular structures mature he lays down, through constant practice, the patterns that will eventually represent both laterality and competence in higher skills. Beginning with the perfection of the eye movements during the reign of the tonic neck reflex, he proceeds through various fairly well defined stages of bilaterality and unilaterality to the initiation of speech and manipulative hand activity by the age of one. As development continues it provides well-established laterality as well as sufficient language and motor skill to begin writing at about the age of six, with further refinements until well into puberty. In the arm this is not so much a matter of strength or brute force but of skill and coordination, although the major arm is often found to be the stronger because of greater use.

Laterality Problems

The problems arising in connection with laterality, the recognition, definition and solution of which is the primary objective of this study, are not problems of right-handedness or left-handedness, of so-called "crossed laterality," or of true ambidexterity in which an individual develops specific skills in each hand. Rather, we are concerned with ambivalence, ambilaterality, or the failure to develop a unilateral proclivity, with efforts to learn the same skill with both hands at the same time. It has been said that the greater the unilaterality in a normal individual, the greater his skill;[3, 7] that is, the more consistently he develops one arm and its cortical elaboration area, the more effective the results. It must be borne in mind, however, that very few even highly skilled activities are strictly unimanual; the minor hand has an essential, though necessarily an assistive or secondary role in stabilizing, supporting or guiding material for the major hand and, in some gross activities where strength and stability are primary requirements, both arms may assume equal roles.

The Effect of Disability

Published studies of laterality with physically disabled individuals can be enumerated on the fingers of one hand. Handicapped subjects, except for those with speech and reading difficulties, have been carefully avoided by those investigating laterality trends in the general population because a differential impairment of the arms or hands produces an additional variable which is difficult to cope with statistically. However both hearsay and experience have indicated that challenging problems arise when the effective development of laterality is impeded or when established laterality is disturbed by upper extremity impairment.

Laterality plays a more consequential part in cerebral-palsied children than in normal or even in youngsters with other handicaps. In the first place their greatest problem is often in the acquisition of basic gross activities, not to mention fine skills. The period of practice required to make a skill automatic and precise may be prolonged and often cannot be initiated without specific pretraining in the form of therapy. Since the injury is often in the cortex or in the commissural and control centers, cerebral laterality can be directly affected and with it the development of skill. Furthermore, the cerebral-palsied child is not as adap-

table as the normal child; he has fewer resources and must make the most of any asset. Failure to achieve laterality, and with it the benefits that accrue from unilateral training and cortical asymmetry, may put an additional burden on the already impaired ability to function.

Occupational therapists in the physical disabilities area, who administer intensive training in skills, must have a clear concept of each patient's laterality and handicap so that they may work with, rather than against, his greatest potentials. This is especially true with children whose laterality and skill patterns are not completely established. Furthermore the occupational therapist, one of whose most vital contributions is in the realm of observation, evaluation and measurement, is often called upon to define and solve problems resulting from the impact of disability and laterality. However she has no practical and valid instruments, no standards and no clear concepts to guide her. It is hoped that this study will be successful in allaying some of the apprehensions and misapprehensions concerning laterality in physically handicapped children.

METHOD

In developing an instrument to measure laterality in physically handicapped children we were not interested in finding out what proportion is right-handed, left-handed or ambilateral, or what differentiates "acquired" from "natural" handedness. Rather tests needed to be evolved that would indicate for each individual where his greatest potentials for the acquisition of fine hand skills are located, in terms of differential disability as well as the predisposing factor, and to what extent he is utilizing this potential. Merely placing him in a category—right-handed, left-handed—was not enough; it was necessary to obtain a pattern, a profile of his ability, and this demanded a new approach in laterality testing.

Two methods have been widely used in handedness testing. The first, the single index, in which the child is subjected to a single more or less complex procedure, may be valid as long as the individual has developed consistent unilaterality. However it cannot outline a pattern or define a problem. Furthermore it has been found that each additional variant factor that a single test attempts to measure reduces its reliability.

The second method is a battery of tests or a questionnaire. The battery principle can be sound and effective in obtaining a laterality profile. It has been most widely used with physically handicapped children although efforts are made from time to time to discover a single index that would be practical for clinic use. However the effectiveness of batteries can be weakened by a tendency to become too large or too long, with the emphasis on the quantity rather than the reliability of items or on the accumulation of masses of data from the repeated application of unappraised tests.

Selection of Tests

The instrument required to give a useful laterality profile in problem cases, it is surmised, should be a battery of a limited number of tests of a high degree of validity, each of which reliably measures the differential performance of a skill unquestionably involved in laterality.

The following criteria were evolved for selecting tests to be included in a handedness battery:

1. Requires the active use of only one hand at a time.
2. Does not prejudice one side by position, direction of motion, etc.
3. Is within the capability of handicapped children.
4. Is not too easy—it should challenge the subject's ability to the degree where laterality, preferred use or better use, comes into play.
5. Does not require unusual, complex equipment.
6. Results can be noted easily and objectively in numerical form in terms of units, seconds, inches, etc.
7. Does not attempt to measure too many variant factors.
8. Is a reliable measure of laterality in actual use.

Each criterion was found to be essential and of equal importance in application to the selection of tests that would be both practical and reliable. Unfortunately very few tests already in use or recommended in the literature measured up to these standards and it was necessary to adapt and improvise. A battery was finally developed, following considerable experimentation, as the major effort in the clinical phase of this study.

Selection of Subjects

Tests were applied to 105 subjects ranging in age from five to twenty years, including 59 males and 46 females. Ninety of these were physically handicapped youngsters in residence at the Illinois Children's Hospital-School and 15 their normal siblings. The roster of disabled youngsters may be considered selective, since only those who were presumed to be able to perform the tests with both hands and those in a suitable working position (capable of sitting) were included. The handicapped group was divided into the following categories:

1. *No hand involvement* (NH)
   Twenty-one subjects with no disability in the upper extremities, including paraplegia, spinal palsy, osteogenesis imperfecta, and a few selected cases of poliomyelitis; nine of these had congenital disability, twelve acquired.
2. *Poliomyelitis* (Po)
   Twenty subjects with unsymmetrical, largely patternless weakness characterizing poliomyelitis.
3. *Muscular dystrophy* (MD)
   Fourteen subjects with symmetrical weakness, usually progressive; three amyotonia congenita, one Merzbacher-Pelizaeus syndrome, as well as true progressive muscular dystrophies were in this group.
4. *Arthritis* (A)
   Nine subjects whose disability involved primarily the joints. Besides rheumatoid arthritis (Still's disease), two

cases with congenital absence of bones or joints in the hand, one each of dermatomyositis and osteogenesis imperfecta completed this group.

5. *Cerebral palsy* (CP)

Of this group of 26, 12 were diagnosed as spastics, 12 as athetoids, and one each as mixed or ataxic. All but two had congenital defects. Eleven additional patients underwent routine laterality testing in treatment on prescription, and seven had both the routine tests plus the research battery. Finally, 24 cerebral-palsied patients were tested on the completed battery.

Administration of Tests

Over a period of two and one-half years the various items of the battery were administered in one sitting to each subject individually by the same tester. Every effort was made to adhere to the rules of examination procedure in regard to physical comfort, distraction and the elimination of variables in order to obtain a reliable result. The subjects were told that they were helping to evaluate skill tests and mention of laterality was minimized. Cooperation and attitude were generally very good.

Since the scores of the tests showed a considerable range in number and were expressed variously in terms of units, inches or seconds, they could not be totaled for each hand to obtain a laterality sum. Besides we were not interested in total scores but in the relationship between the arms, in the *ratio* of the scores for each type of test. Therefore all the scores were converted into percentages according to the following formula: $\frac{M}{M+m}$ (M: Major, m: minor). Fifty per cent represented the midline or equal scores; 100% showed total incapacity or disuse of the minor hand; over 50% meant greater use or skill in the major hand; under 50% was equivalent to superiority or greater preference for the minor hand in that test.

In addition to the testing, the hand used in writing and eating was observed on each child in the school room and in the dining room. From the records information was obtained on heredity, age of onset of disability, previous handedness, evidence of transfer, seizure activity and electroencephalography. Every cerebral-palsied child was examined for a tonic neck reflex. A numerical muscle strength or joint motion index for the upper extremities as well as the ratio of disability between the two sides was computed from muscle and joint examinations given by physical therapy in an effort to gain a more objective and more graphic view of the handicap. To obtain the muscle strength index, 12 major muscle groups in each upper extremity were given a value of 5% (normal), with double value (10%) for the four most important groups (shoulder, elbow, finger flexion and thumb opposition), making a total of 100% for each normal arm. The degree of variation from normal was easily obtained by transcribing the numerical system used to grade muscles (0-none, 1-trace, 2-poor, 3-fair, 4-good, 5-normal), doubling the amount for weighted groups. The joint range index was based on the percent of total (average-normal) motion expected for each joint, and computed separately for each joint, using the same basic motions included in the muscle strength index, and giving double value to the four most significant groups. The information about each child as well as the results of the testing were posted on a card for easy reference.

FINDINGS

Validity of Tests

Any discussion of the findings, conclusions drawn therefrom and recommendations based on test data are worthless unless it is certain that the instrument used measures laterality and does so with a high degree of competence. Since the eight criteria outlined earlier were strictly adhered to in the selection of the tests, certain variables were already eliminated. However it was also necessary to analyze each item in terms of reliability in actual use.

The criterion for validity in each test was the frequency with which the major hand, as determined by the hand habitually preferred for writing and eating, was the hand that scored either greater preference or greater skill. At least 75% of the subjects tested had to demonstrate this agreement for the test to be considered valid. Equal scores with both hands as well as better scores with the minor were adjudged invalid.

Preference: Habit Items

Preference of habit items, or the hand used to perform certain activities of daily living, has always had a prominent role in the determination of laterality, in many instances comprising all or most of the test or questionnaire. Since those activities requiring some degree of manipulative skill are unquestionably influenced by laterality, and since we may assume that the hand habitually used is more suited to its task than the other as a result of predisposition or practice or both, selected items of this nature were considered trustworthy indices of handedness. Furthermore in handicapped children especially, problems revolve around and must be solved for the sake of specific training in the two most important of these functions: eating and writing.

In selecting the activities to be considered for evaluation in this study, batteries and questionnaires presented in the literature were consulted. Impractical and untrustworthy items were at once eliminated according to the basic criteria outlined earlier, among them the baffling and equivocal bimanual activities (including sweeping, holding a bat, lacing a shoe); those activities that prejudice one side because of position, direction of motion, or conformity to social pressure (operating a light

TABLE I. VALIDITY OF HABIT ITEMS

Activity	No. of Subjects	*Preferred Hand*			Validity	Comment
		Major	Minor	Equal		
Writing (if unable: coloring, scribbling)	105	95	5*	5	90%	*Only writing retained in more disabled arm after onset of handicap. Item retained.
Eating: self-feeding with a utensil.	105	95	0	10**	90%	**3 undergoing spontaneous handedness transfer. Item retained.
Buttoning: 3 small buttons on front of body.	51	30	21	0	59%	41 buttoned according to sex (boys left; girls right); 8 used major because "sex" hand too disabled, esp. the thumb. Item rejected.
Bow Typing: Shoestring on a board on the table.	50	22	25	3	44%	Followed both buttoning and laterality in an equivocal pattern. Item rejected.
Sighting Eye: looking through small hole into peepshow.	42	24	17	1	57%	Preferred eye instead of hand. Item rejected.
Sucker: removing paper wrapper.	41	13	14	7	32%	7 held sucker in major hand and unwrapped with mouth. Item rejected.
Stringing Beads: 6 round beads on shoestring.	38	21	14	3	54%	Major hand held bead.
	38	28	9	1	73%	Action by major hand (string or bead.) Item rejected.
Receiving: pencil from right hand of tester.	33	27	6	0	80%	Lateral influence. Item rejected.

switch, faucet, doorknob; catching a ball; shaking hands; wearing a wristwatch); those activities not considered within the capacity of most handicapped children (striking a match, dealing cards); and those that require subjective determination of the major role (threading a needle, winding yarn), as well as tests in these categories and others indicated by reports in the literature to be unrelated to laterality (clasping or folding arms, or hands).[36, 37, 38]

The remaining activities, including some about which we were doubtful, were tried out on the various groups of subjects; the results are shown in Table I.

Further items were checked on a limited number of subjects (12 cerebral-palsied patients). Of these, using crayons, toothbrush, comb or scissors were found to be highly reliable (90-100%); in several subjects transferring handedness, especially from right to left, cutting with (right-handed) scissors was the last function to be converted. Other activities that were found to be unreliable included waving goodbye, drinking from a cup (both hands were too frequently used), operating a zipper and untying a bow (50-72%).

Preference: Tests

Each habit item represents a single index that does not lend itself readily to quantitative analysis. It has been found desirable to determine with what frequency the major hand is used in certain skilled tasks unrelated to habit or previous training. These are the so-called preference tests, in which the subject is asked to manipulate a prescribed number of units, the number of times each hand is used being counted to obtain a laterality ratio. In selecting these items it was again necessary to apply the criteria, thereby eliminating many tests that were bimanual, prejudicial, required unusual equipment or subjective evaluation, and many that were too easy. The remaining tests are analyzed in Table II.

All the subjects on the clinical series could handle the Susie test. However, it has proved too difficult for some cerebral-palsied patients with severe physical or visual perceptual difficulty. For these a series of substitute tests in a descending scale of difficulty was found effective. The series consist of:

1. Round Peg Board: removing and replacing six pegs in holes in corresponding color sections of a circular board.

2. Blocks: moving six large blocks from table to a box.

3. Pointing to objects: Lotto cards, small toys, shell game, etc.

These items were given, through a misunderstanding, to a few subjects for whom they were too easy as well as to those for whom they presented

TABLE II. VALIDITY OF PREFERENCE TESTS

Test	No. of Subjects	*Preferred Hand*			Validity	Comment
		Major	Minor	Equal		
Susie Dish: Placing 15 form blocks into corresponding holes on lid of dish.	105	85	20	0*	80.9%	58% placed all 15 units with the major hand. *Odd number obviates equal scores; error now corrected (12 units). Test accepted.
Hammer: Pound down 6 tacks distributed on a soft board.	33	14	7	12	42.2%	Large proportion of equal choices. Test rejected.
Gun: Strong gripping releases rubber rings (6).	28	25	2	1	91.6%	Equipment not readily available. Test rejected.
Mailbox: Placing 12 form blocks into holes on 3 sides and top of shaped box.	14	10	3	1	78.5%	Prejudiced by equipment and tester: box must be turned. Box too high for small subjects. Test rejected.

a challenge. It was found that each test was valid for an individual only if he was too disabled to perform the next highest test in the scale. The more difficult a test he could perform the less valid the results were for the easier tasks. Thus the subjects were able to achieve valid results (80%) on their top tests, but just approached validity (75%) on the next easier test, and tended to receive equivocal results (50%) on all tests below this.

TABLE III. LEAD BY DIAGNOSTIC GROUPS

Lead, Major Hand	N	NH	Po	MD	A	CP	Total
All Tests (100%)	100%	81%	70%	64%	56%	82%	77.2%
Most Tests (80-60%)		19%	30%	22%	33%	13%	18.8%
Half of Tests (50%)				7%		5%	2.0%
Less Than Half (40-20%)				7%	11%		2.0%

Preference: Lead

Another aspect of preference that is given considerable weight on many laterality tests is lead, or notation of the hand that initiates activity. In each item presented in the clinical series the subject was given complete freedom in choosing the hand that was to perform first. Influencing this choice by suggestion or placement of the material or utensils was carefully avoided. Lead was simply indicated by underlining the score of the hand that initiated the activity. Only on simultaneous bead transfer did lead not apply. On the preference test (Susie Dish) some of the weaker subjects tended to pick up the units with one hand and place them with the other. In this case lead was ascribed to the hand that manipulated (placed) the units; in most instances this was the major hand. The proportion of the tests on which lead was consistent with the major hand, outlined by diagnostic groups, is given in Table III.

Nineteen of the 36 subjects who failed to lead with the major hand on one or more tests showed evidence of either complete or partial transfer of handedness, unconsolidated laterality, or a better minor hand; the rest occasionally led with the minor hand for no apparent reason.

Skill Tests

If orthodox procedure were being followed, the analysis of testing measures would end here. It has been customary in determining laterality in both normal and handicapped children to rely almost exclusively on preference, using habit items and multiple choice tests. However since we were interested in finding solutions to individual children's problems rather than determining their laterality *per se*, it was found necessary to search for additional methods to get at the crux of the difficulties. An analysis of 11 cerebral-palsied youngsters with presumed laterality problems who were given only preference tests indicated that although these tests were able to elicit the presence of a problem in seven of the cases, in none were they able to define the problem or indicate causative factors. In 11 similar subjects who were given skill tests, the presence of a problem was pointed up in each case and the difficulty could be defined, explained (and solved) in nine of the cases.

Tests of comparative skill seem essential to a fairly definitive laterality battery, since it is for the sake of skill that laterality develops and in terms of comparative ability that laterality is expressed. Therefore a number of instruments of this nature, again selected according to the eight criteria, was devised and evaluated. In all these tests the activ-

TABLE IV. VALIDITY OF SKILL TESTS

Test	No. of Subjects	*Better Hand*			Validity	Comment
		Major	Minor	Equal		
Tracing: Trace with pencil 10½" circle and 10½" star. Total circumference 23"	(a) 104 (b) 72	90 67	11 2	0 3	86.5% 93.0%	Originally tracing paper used; tracing directly over line printed on paper facilitated scoring. Test accepted.
Bead Transfer: Grasp and transfer 3 handfuls of assorted ½" beads from box of 1000 into empty box.	(a) 69 (b) 45	43 27	26 18	0 0	62.1% 60.0%	*Each hand separately*: practice effect on minor hand of able subjects (major usually led).
	(a) 36 (b) 28	26 22	8 5	2 1	72.2% 78.5%	*Both hands simultaneously*: reduced practice effect. Test accepted conditionally.
Bead Speed: Pick up 1 at a time ½" cube beads and drop into 3½" high jar, in 15'.	(a) 93 (b) 67	61 44	18 11	14 12	65.6% 65.6%	Practice effect in able subjects. Instructions sometimes hard to follow (one at a time). Test accepted.
Peg Speed: Place 6 shaped pegs in small holes in vertical board, timed.	(a) 91 (b) 67	60 42	26 20	5 5	65.9% 62.6%	9 subjects unable to perform with minor hand; practice effect in able subjects. Too many variables. Test rejected.
Punch: Perforate ½" targets (concentric circles) on paper with push-pin, in 15'	(a) 43 (b) 29	30 20	10 7	3 2	69.7% 68.9%	Difficult to administer; instructions hard to follow. Results equivocal: too many factors. Test rejected.
Block Speed: Pick up 1 at a time and drop into flat box 6-1" cubes, timed.	(a) 34 (b) 22	24 17	9 3	3 2	70.5% 77.2%	Alternate for more difficult bead speed. Too easy for able subjects. Test accepted.

ity was performed first by one hand (subject's choice) and then under precisely the same conditions by the other. Results were measured objectively in units, inches or seconds; subjective analysis —"seems to perform better"—could not be accepted for statistical analysis.

The results were analyzed twice, as indicated in Table IV, once (a) in terms of the total group tested (105 subjects), and again (b) in terms of only the unilateral subjects (73). The 32 subjects omitted from group (b) showed discrepancies in disability (specific unmatched disabilities distributed on both sides) as indicated by muscle strength and joint motion charts or had effected a partial transfer of laterality as the result of an encroaching handicap.

Efforts to find a successful test for strength of grip have so far met with failure. The literature has also reported difficulties with items of this nature,[39, 40] the only successful test being the simultaneous use of two dynamometers,[41] equipment not readily available in most occupational therapy departments. Throwing (for distance with a non-bouncing or non-rolling object) has recently been included but not tested on the original subjects. The punch test and the peg test apparently attempted to measure too many factors and presented difficulties in their present form. Others have experienced difficulties with peg-placing tests which are apparently more readily subject to a practice effect unless performed simultaneously by both hands.[42] Our own experience with the Purdue peg-board has borne this out but the literature unfortunately does not contain any reports on this in terms of laterality.

The bead transfer and bead speed tests also manifested difficulties with a practice effect resulting in a large proportion of negative scores among the more able subjects; however since the two tests gave valid results in the more disabled groups, for whom they were intended (poliomyelitis, muscular dystrophy and cerebral palsy; the arthritics were equivocal in all areas), they were retained in the battery. Table V indicates validity of the tests by diagnostic groups, the classifications: (a) total group, and (b) in-discrepant group again being used.

Additional information was also gained in relation to the bead transfer test. It was considered valuable to obtain the hand size of the subject, using a gauge that measured width at the metacarpo-phalangeal joint (thumb excluded) and length from the base of the hand to the tip of the middle finger. Although this did not correlate

TABLE V. VALIDITY (%) OF SKILL TESTS BY DIAGNOSTIC GROUPS

Test	(a) Total Group N	NH	Po	MD	A	CP	(b) Unilateral Group PO	MD	A	CP
Tracing	93.3	90.9	95.0	78.5	50.0	84.5	91.6	85.7	100.0	92.8
Bead Transfer										
Separate		43.7	71.4	50.0	57.1	76.1	80.0	40.0	50.0	91.6
Simultaneous	66.6	73.3	50.0	75.0	100.0	71.5	100.0	100.0	100.0	50.0
Punch	66.6	80.0	60.0	100.0	0.0	69.2	100.0	100.0	0.0	60.0
Peg Speed	40.0	52.3	77.7	83.3	50.0	88.2	90.0	71.4	33.3	90.9
Bead Speed	46.6	50.0	76.4	83.3	37.5	85.7	100.0	71.4	66.6	83.3
Block Speed		50.0	82.9	66.6	48.4	100.0	75.0	80.0	50.0	100.0

significantly with the total number of beads obtained—disability was apparently a more potent factor—the few cases[11] that showed a discrepancy in the size of the two hands tended to show a similar discrepancy in the bead transfer scores.

The completed battery of one preference and four skill tests was finally used with all the cerebral-palsied patients currently in the treatment program; results are indicated in Table VI.

TABLE VI. VALIDITY OF FINAL BATTERY
(Cerebral-Palsied Subjects only)

Subjects	Number	Preference	Skill			
		Susie	Tracing	Bead Transfer	Bead Speed	Throwing
(b) With discrepancies	18	94.4%	100.0%	88.8%	81.3%	100.0%
(c) With discrepancies	6	50.0%	66.6%	33.3%	33.3%	83.3%
(a) Total Group	24	83.3%	91.7%	75.0%	71.4%	91.7%

Seventeen of the 24 subjects tested were presumed to have no laterality problems; on all 17 the battery elicited no problems. Five were so disabled on the minor side that they were unable to perform three of the four skill tests with that hand, bead transfer being the only test that all could perform with both hands.

Seven subjects had laterality testing prescribed at one time or another and were presumed to have problems; the tests indicated in two cases that the problems were resolved, and in two cases defined the problem and indicated a solution. In the three remaining cases the battery elicited the presence of a problem and a partial definition, but it was felt that repetition of some of the items and the addition of further information (such as a muscle examination where none existed) were necessary to the solution. In no case was there any doubt about the hand that possessed the greater potential for writing.

Ancillary Findings

Other information obtained about each subject to correlate with the test findings resulted in the following observations:

1. *Heredity.*

For the non-cerebral-palsied subjects no record of familial handedness was found in the case-histories and in only six cases was there a note of laterality before onset of disability. Sixteen of the 25 cerebral-palsied cases reported such information. Of these, eight were right-handed subjects (50% of all the right-handed cerebral-palsied) and six reported right-handedness in the parents. The eight left-handed subjects who had familial information represented 75% of the left-handed cerebral palsy group. They reported either in terms of distant relatives who were left-handed, or "no left-handedness in family." This dearth of information warranted no conclusions except that parents of left-handed cerebral-palsied children are more apt to make a statement about laterality in their family, either denying it or searching for evidence of left-handedness.

2. *Disability index*

The muscle strength and joint motion indices computed from tests made by the physical therapists proved useful in assaying the amount and distribution of disability in cases where loss of strength or joint motion constituted the handicap. Muscle strength indices were obtained for all subjects in the poliomyelitis and muscular dystrophy groups and for two-thirds of the cerebral-palsied group. In the former groups they proved invaluable in delineating a true picture of disability. In the cerebral-palsied group they gave fairly accurate indications in the atonic cases, but were only relatively useful with those whose symptoms were not

primarily weakness but rather involuntary, uncontrolled and incoordinated motion.

3. *Sex*

For the group as a whole there was a slightly greater incidence of left-handedness among the boys (6%); however, this may have been influenced by the fact that the normal youngsters, who had the smallest proportion of southpaws, were also the only groups to contain less males (27%) than females. In other aspects of the testing program, as well as the ancillary findings, no significant sex differences were elicited.

4. *Age*

Although of course the raw skill scores showed gradual improvement with age, the ratios of only the tracing scores seemed to be influenced by age, demonstrating less difference in skill between the two hands as the subjects grew older. Other findings, such as preference and disability ratios, were not significantly affected by age.

Other correlative findings from the medical history, such as age at onset, electroencephalography, etc., will be discussed in relation to the diagnostic groups to which they specifically pertain.

Summary of findings in various diagnostic groups

1. *Normal*

Of the 15 normal youngsters tested, one was left-handed, giving a ratio of 93% which corresponds closely to that of the general population.[8, 10, 33] No ambivalence was found and a picture of strong unilaterality was presented, especially in preference and on the tracing test. However the tests that presented little challenge to this undisabled group (bead transfer), or tended to be subject to a practice effect (bead speed, peg) were often performed equally well or better with the minor hand, resulting in unreliable ratios for the group as a whole.

2. *No hand involvement*

In the group with no disability in the upper extremities, numbering 21, two were left-handed and one ambivalent, a proportion that still approximates that of the general population. The laterality pattern of this group was similar to that of the normal subjects except that they were not as strongly unilateral on the preference and tracing test and that they achieved a greater proportion of valid scores on the other tests, but remained significantly below the ratio desired for a reliable instrument.

When matched by age these subjects averaged 20% less skilled than the normal ones until the age of thirteen, but equalled or surpassed the normal subjects above this age. One outstanding exception was the case of thirteen-year old identical twins, where the handicapped (paraplegic) youngster was considerably more skilled than his normal sibling. The fact that about half of the manually non-handicapped were less skilled than their normal peers may account for the fact that as a whole this group tended to receive proportionately more positive scores on the tests where stress seemed to be a factor. It is of interest to note that those who had been disabled from birth averaged 25% poorer scores than those who experienced a normal birth and first year of life, irrespective of their maturity at the time the test was administered.

3. *Poliomyelitis*

The subjects with the asymmetrical loss of strength that characterizes poliomyelitis demonstrated the impact of disability on laterality. Six of the 20 were left-handed and two ambivalent, making a right-handed ratio of only 60%. They showed strong unilaterality on the preference and tracing tests, and as a group received reliable results (at least 75% positive scores) on the remaining items.

Ten subjects who suffered greater disability on their major side reacted in several ways:

a. Immediate spontaneous transfer of function to the minor arm (four cases; average loss of strength: 60%).

b. A reluctance to transfer despite apparent necessity to do so, resulting in:

(1) Delayed complete transfer (one case; loss of strength: 69%).

(2) Partial transfer, relearning every activity except writing (one case; loss of strength: 61%, grasp intact).

(3) Temporary transfer, reverting to the major hand as it improved (one case; loss of strength: 35%).

(4) No transfer, persistence in using the more involved major hand for learned skill, the minor hand assuming a more active assistive role (three cases; average loss in strength: 31%).

This reluctance to transfer and its specific solutions seems to depend on a combination of three factors: the patient's age, the strength of his original laterality bias and the amount and kind of disability. It was found that grasp must be intact for writing; no one with a loss of more than 45% of total strength in the major arm was able to resist transfer. Although in general the difference between the two arms was greater in those who transferred, the specific condition of the minor limb does not seem to be a factor, as long as it is relatively more able. In all these subjects the right arm was the major arm; for all the polios tested the right arms (regardless of laterality) showed the greater disability in two-thirds of the cases. The ten subjects who were not faced with the necessity to transfer had either equal involvement or greater disability on the minor side.

Using the medical records and muscle examinations on all poliomyelitis patients (37) admitted to the hospital-school between January, 1948, and January, 1953, the following information was elicited:

TABLE VII. DISTRIBUTION OF EQUIVOCAL RATIOS
(13 CP's with laterality problems)

		Preference				Skill			
		Eat	Write	Test	Lead	Trace	B.T.*	B.S.*	Throw
Group (a)	1.	X			X		X		X
	2.		X	X		X			
	3.	X	X						
	4.			X	X				
Group (b)	1.			X	X		X	X	
	2.			X	X		X		
	3.				X		X	X	
	4.							X	X
	5.			X	X		X	X	
	6.		X	X		X	X		
Group (c)	1.	X				X			
	2.					X	X	X	
	3.			X	X			X	

*B.T. refers to *bead transfer*; *B.S. to bead speed.*

If onset of the illness occurred before the age of six, fairly equilateral involvement of the upper extremities predominated (less than 5% difference in strength between the arms in 13 out of 15 cases); between the onset ages of six and ten this trend continued in 55% of the cases; the rest received greater disability on one side (three out of five in the original major arm). Beyond the onset age of ten, two distinct patterns emerged: either the involvement in the upper extremities was equal (or there was no involvement above the waist), or it was more strongly unilateral (a difference of more than 5%). Of the total group 70% had greater involvement in the major arm. If poliomyelitis occurred after the age of twelve, all subjects experienced more disability on the major side.

It is felt that this small sample does not warrant drawing any broad general conclusions about the relationship between previous laterality, age of onset, and distribution of paralysis in poliomyelitis as a whole. However the patterning of results suggests that further studies along this line with larger groups might yield some significant findings.

4. *Muscular Dystrophy*

The 14 youngsters who were subject to a symmetrical congenital weakness (amyotonia congenita) or a symmetrical progressive loss of strength showed a right-handed ratio of 86%, which is close to that found in the general population. Their muscle strength indices showed very little difference in power between the two arms (usually less than 1%) until contractures set in, and this trend was reflected in their response to the tests. Weaker unilaterality was shown on preference and tracing tests; the skill tests were within or close to the limits of reliability. It appears that with the symmetrical handicap laterality develops normally and that the characteristic weakness is disabling enough to make the tests challenging, resulting in more reliable scores unaffected by lack of stress and a practice effect.

Time studies in this group indicate that in many cases strength is lost at a differential rate in the two arms, in response to which a spontaneous temporary transfer of some or all functions may occur. Unlike the pattern in polio, the difference that prompts the change is usually slight (less than 1%) and there is less reluctance to use the minor hand. In later stages when contractures in the position-of-use set in, the patient seems to react more like a polio or an arthritic, using continuously what is available regardless of laterality, but often retaining writing in the originally major hand.

5. *Arthritis*

The nine subjects suffering from disabilities resulting from lack or loss of joint motion included only four who were primarily right-handed, and of these only one was using consistently what constituted the better side. The involvement tended to be very erratic, with no pattern or symmetry, and in some cases contractures had developed in the position of disuse. Test results were also extremely erratic, with 50% or less achieving positive scores on the tests, bead transfer excepted. The tendency to retain the original writing hand and transfer all or most other functions resulted in six cases of split laterality, and one other persisted in the use of a more disabled major hand. Despite a strong inducement to use what was less disabled, an effort to retain the major hand was apparent, often resulting in position-of-use deformities, which were either facilitating or eventually more disabling.

6. *Cerebral Palsy*

Sixty per cent of the cerebral-palsied group were right-handed, in equal proportion in the spastic and the athetoid subjects. They received a reliable ratio of positive scores on all the valid tests except

simultaneous bead transfer; the practice effect and lack of stress factor seemed to be of minimal importance in this group. Efforts to correlate data on seizures, electroencephalography and tonic neck reflex with laterality proved impractical because the small number who were subject to these factors presented equivocal findings.

Of 44 cerebral-palsied youngsters, including those tested on the final battery as well as those seen in the original series, 13 were revealed to have laterality problems as shown by the profiles of the test results. The pattern of equivocal ratios (equal scores with both hands or better score with the minor hand) on habit items and tests, as well as the distribution of disability, divided them into three distinct groups as follows (see Table VII):

Fig. 1. Susie Dish Preference Test

Group (a). These subjects all had equilateral or midline lesions with relatively mild involvement and fairly adequate hand use. Two of them were spastic and two athetoid. In age they averaged six and one-half years, with evidences of some physical immaturity and mental retardation. Ambivalence in choice of hand for any task was their primary difficulty.

Group (b). These youngsters, four of whom were athetoid and one each spastic and ataxic, all showed evidence of differential lesions of both sides, with special defects and special abilities in each arm. As a group they were moderately disabled, often with poor hand use. They averaged nine and one-half years in age and numbered among them two with aphasia, one of whom had been subject to seizures. These youngsters were constantly experimenting with the enigma of a differential disability (a good hand on a poor arm) and what to use most effectively for a given activity.

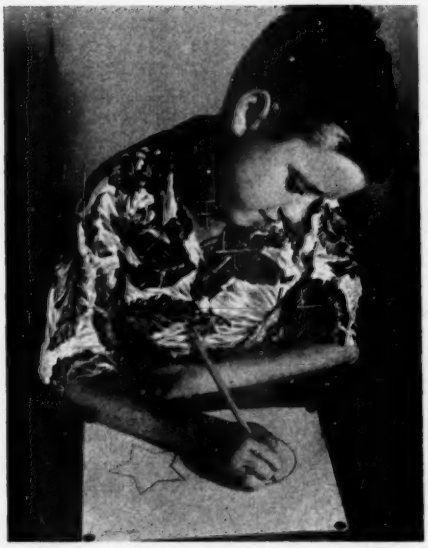

Fig. 2. Tracing Test

Group (c). All of these children, whose ages averaged thirteen, had clearcut one-sided or differential disability. Two were athetoid and two spastics; disability ranged from mild to severe, with fair to poor hand use. No. 1 was in the process of spontaneous transfer from the less to the more able hand; No. 2 had resolved an earlier confusion in terms of special abilities on each side; No. 3 was using special abilities on one side to advantage despite greater disability in other areas. In short, the problems of these children were not in their neuromuscular mechanism, but in the mind of the beholder.

DISCUSSION

A. *Testing Instrument*

Detailed analysis of various tests and other procedures in terms of validity for determining laterality and effectiveness for elucidating laterality problems, followed by the elimination of invalid, unsignificant and impractical items, has resulted in the proposal of a standard battery of procedures, as follows:

1. Observation of writing or writing activity (scribbling, coloring).
2. Observation of eating with a utensil (spoon, fork).
3. Observations of any of the following, at will:
   a. Use of scissors
   b. Use of toothbrush
   c. Use of comb
4. Obtain a muscle strength or joint motion index and ratio.
5. Administration of test battery:
   a. Preference test:
      (1) Susie Dish (Figure 1), or one alternate for more handicapped children:
         (a) Round Peg Board
         (b) Blocks
         (c) Pointing
      (2) Note lead for all tests given (preference and skill)

Fig. 3. Simultaneous Bead Transfer Test

b. Skill tests:
   (1) Tracing (Figure 2).
   (2) Bead Transfer:
      (a) Simultaneous, if able (Figure 3)
      (b) Separately, if unable to perform bilaterally (Figure 4)
      (c) Measure hand size
   (3) Bead Speed (Figure 5) or alternate for more handicapped:
      (a) Block Speed (Figure 6)
   (4) Throwing for distance (Figure 7).

This battery represents a new departure in both content and method. It is felt that reduction of preference items in favor of tests of comparative skill, which is in line with the basic concept of handedness outlined earlier, resulted in a more meaningful and precise instrument. Furthermore the fact that the battery was designed to be used as a spot test, with a minimum of repetition, the fact that it is capable of providing an answer within a day makes it a more practical and much more efficient measure.

The findings indicate that by accepting only those items for the battery that were unquestionably involved in laterality and of proven validity, this instrument was capable of reliably demonstrating handedness where it had already developed and of indicating the potentially more able side where laterality was not yet extant. Furthermore analysis of problem cases in all diagnostic groups demonstrated that the very pattern of the test ratios tended to point out the existing difficulty. This is, if two or more of the preference items (habit, test, lead) or skill tests gave equivocal or negative results (equal or greater score by the minor hand), a problem was surmised to exist and further scrutiny of the results was indicated. Detailed analysis in terms of other known factors (muscle strength index, hand size, special defects, etc.) served to explain the discrepancies in some cases and indicated that no real problem existed; in others definite signs of ambivalence were detected, the pattern of disharmony indicating the source of the difficulty. In other words a child, who showed consistent results on the major side in all areas (preference, skill, the indices), had one unexplainable variant or an additional negative score that could be explained on the basis of special defect, was considered possessing essentially normal laterality; the existence of two or more unexplained discrepancies indicated some difficulty, further analysis of which

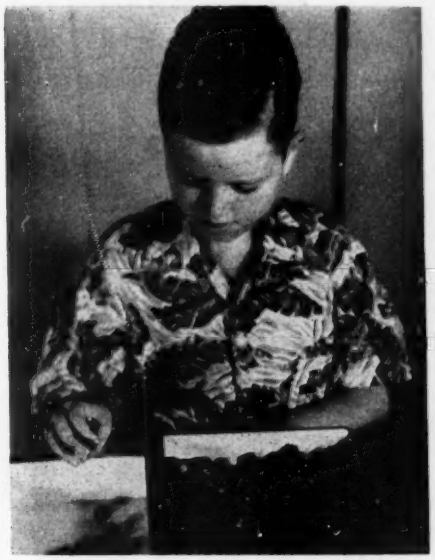

Fig. 4. Separate Bead Transfer Test

revealed in most cases a problem requiring attention, often pointing out not only its origin but also the means of solution.

Although the battery represents the best instrument the writer has been able to evolve after several years of experimentation and though it has been adopted for use in the definition of laterality problems, it is in need of some further supplementation and is capable of considerable refinement.

The Stress Factor

Analysis of the test results for all diagnostic groups revealed one significant factor that applied equally to preference and to skill tests: the easier the test and the less challenge it presented to the subject, the less reliable it became in terms of laterality. The subjects with little or no manual disability were the ones who received a greater proportion of negative scores largely as the result of a practice effect. On the other hand even the subjects with equal or symmetrical involvement could demonstrate laterality reliably on the tests as long as they were disabled enough to require

top performance and maximum exertion to complete the activities. Thus it was found that the problem of stress, a variant inherent in each individual according to age, experience and disability, was a disturbing factor in the reliability of the procedures and one that would render standardization of these tests on large unselected groups of children impractical. Laterality tests for the physically handicapped need to be standardized on the physically handicapped; the use of normal or manually undisabled children as controls seems contraindicated, and borrowing tests from one group to use in the other without due evaluation seems unwise.

Fig. 5. Bead Speed Test

B. *The Solution of Problems*

Laterality problems in physically handicapped children may be divided into two categories: (1) those in children with normal early development whose established laterality was disturbed by unilateral or differential involvement; and (2) those in children with a congenital defect that resulted in unilateral or differential impairment of the arms or faulty growth of the central nervous system which interfered with the normal development of laterality.

Our findings reveal that in the first category even a very disabling unilateral handicap on the major side, leaving a normal or much more capable minor arm, did not necessarily result in transfer of laterality. The amount of disability in the major arm seems to be only one of many factors, and a variable one from group to group. Thus a polio could resist change with a loss of almost 50% of normal power, whereas a muscular dystrophy would transfer to the minor hand if it was only 1% stronger than the left. The distribution

Fig. 6. Block Speed Test

of the disability, the age of the subject and the strength of his original laterality bias seemed to be factors of equal weight with the amount of loss incurred.

A strong reluctance to transfer established writing to the minor arm was noted, and in many cases, where sufficient grasp remained, this function was retained in the more involved major arm while all other activities were converted to the more able minor limb.

Handling Disability-Induced Problems

With these facts in mind it may be stated that it seems just as unwise to expect and force those with greater disability in the major arm to transfer all functions to the minor side as it is to expect to retain and retrain all functions in an established major arm regardless of the degree of disability. Rather than following a rigid formula at either extreme, the child should be given a chance to evolve his own solution in terms of his individual needs as well as his particular handicap. The opportunity for uninhibited experimenting with his new physical set-up, and undergoing the testing itself, can be very helpful in showing both the patient and the therapist where the best solution lies. It is apparently not necessary that all functions repose in the same arm, and the practice of using special assets in each arm for specific functions or of retaining the writing hand but transferring all other skills, has offered a satisfactory and practical solution in many cases. It is felt, however, that a child with a loss of more than 50% of strength or motion in the major arm, including grasp, with greater abilities on the minor side, should be encouraged to transfer all functions despite some reluctance to do so.

These children, as well as those who effect a spontaneous transfer as a result of devastating disability or weak original bias, need to be given time to make the decision and initiate the change, and then require assistance, support and specific training to complete the conversion and establish the skills as quickly as possible. A conversion of handedness must be effected *with* the child, not forced on him against resistance nor expected to be completed by him without encouragement and help.

It is felt that the tendency for temporary transfers typical of the progressive disabilities represents an effort to maintain the highest possible level of skill despite a waning power supply and should not be interfered with. Rather than building strong unilaterality for a life-time of use, these youngsters are attempting to prevent, with both hands, the inexorable destruction of their abilities.

The Effect of Congenital Defect

Lack of normal laterality development as a result of disability incurred before birth or in early infancy presented entirely different problems. Since most of these cases were the cerebral palsied, the subject will be discussed from the point of view of this condition.

The findings presented by the test battery divided the problem cases into three groups. Following this general pattern, three distinct problem entities may be discussed.

(a) *Immaturity.* These were the subjects discovered by the battery to be alternating in the choice of hands on preference items. They were characterized by midline or symmetrical lesions, usually relatively mild, accompanied by neurological immaturity and mental retardation. These children were bilateral; chance or opportunity seemed more powerful factors in the choice of hand used than cerebral laterality. They ate and attempted to write with either hand and generally showed equivocal results on preference items. However, skill tests tended to give a more positive picture and usually indicated fairly consistently the potentially more able hand.

This bilaterality, which was normal at an earlier age, became a handicap when it persisted beyond the age of five and six because it interfered with the consistent development of higher skills necessary both to physical independence and communication. Even a child who had minimal disability and had learned some skills in spite of his bilaterality, reached an impasse in the improvement of finer skills, especially writing, as long as he continued to alternate.

The solution to those problems has been consolidation of function in the potentially more able hand as indicated by the skill tests. In one instance where no consistent difference in skill could be elicited, the right hand was selected as the major one, and laterality developed successfully on this side. Consolidation in these cases was effected by making the child aware of his better side; minimizing for a time activities that induced alternating or required both hands, and teaching new skills to the major hand. The more consistent and concentrated the training, the more rapidly consolidation and improvement in skill resulted. In some cases delayed laterality developed spontaneously without training; however laterality should be established by the time a child enters school, and waiting for delayed consolidation, with no assurance that it will occur, may be impractical and injurious to the child.

Fig. 7. Throwing Test

Although those tested tended to have mild disabilities, the severely handicapped, with symmetrical lesions and essentially no hand function should also be included in this group. They usually indicated either hand when asked which they preferred. They developed no handedness because they had no hand function. We were confronted with the question of which hand to train. The tests were useless here because these children were unable to perform any of the items. It was found, however, that if training was begun bilaterally with very simple activities, as function improved one arm was noted to learn more quickly and perform more adequately, one arm improved more rapidly than the other, eventually emerging as the major one. As hand function developed so did laterality.

(b) *Discrepancy.* The discrepancy group was the largest and presented the most difficult problems. These children had differential involvement on both sides which resulted in moderate disability and only fair hand use. The pattern elicited by the tests was not so much one of ambivalence as inconsistency in relation to certain functions in terms of skill rather than preference. Since two-thirds of these youngsters were athetoids it was especially difficult to assay their disabilities and the tests had to be more heavily relied on for solutions. These children, as a result of special defects and abilities on each side, were still experimenting at a rather advanced age (nine, ten) in an effort to find the most useful unit for certain tasks.

Solutions in these instances had to be based on

their individual problems with no formula for the group as a whole. It has been said that children of this type will use the side that has the better finger function for writing and the one that has the better shoulder for eating. This was not found to be generally true among our subjects, all except one of whom developed a unilateral proclivity despite their discrepancies. Besides that statement does not take into account the vital role of elbow, forearm and wrist. It has been found that the hand that possessed the better grasp was generally used for writing; however, if it was on a less controlled, more incoordinated or tenser arm (elbow and shoulder), it was not useful for writing despite the better grasp.

The case of a sixteen year old severely handicapped spastic boy, with poor speech and writing ability, may demonstrate this. Although he ate and wrote with his right hand, it was noted that he picked up objects with his left. He was given a series of preference tests that involved handling small pegs and blocks, and performed all of them with his left hand. Then, since a problem was thought to exist, he was tested on the complete battery where the same pattern was reinforced by a superior bead speed score for the left hand. Analysis revealed, however, that although this boy's left hand possessed a fine pincer grasp, which the right did not, the left arm was so incoordinated that he could not rely on it for any basic skills. The right hand had superior gross grasp and the right arm was capable of some controlled and coordinated motion. Therefore he used the right arm for eating, writing, and other basic functions, but also utilized the special skill of his left hand to pick up objects and place them in the right hand for manipulation and use. He had found the best solution to his particular problem.

The throwing test in some cases revealed a superior shoulder; however, three of the subjects were able to throw better with the minor arm (i.e. the one not used for writing) not so much as the result of a superior shoulder, but because they possessed better release in the hand on that side. In these cases the hand that had better grasp showed poorer release; the hand that had good release had practically no grasp, the dart being wedged between the thumb and second metacarpal.

In consolidating handedness for these children we were not trying to make them unilateral, but rather attempting to eliminate their ambivalence and settle the development of specific skills on the requisite side. That in some cases unilaterality resulted was in response to the individual's particular make-up. In some of the cases where consolidation was completed the children developed consistent laterality for basic skills, but continued to alternate in random, unskilled activities. Methods of consolidation were the same as used with the immature groups. In many cases these methods had to be applied more intensively because of the age of the patient. If a child persisted in his inconsistency beyond the age of ten, efforts at consolidation had to be very intensive to obtain results; beyond the age of fourteen the inconsistency or ambivalence itself could be considered the established laterality pattern, no longer amenable to change.

Physical restraint was used in one case to force development of the writing hand, the question of unilateral seizures on the designated minor side being involved here. Results obtained from wearing the restraint were negligible and not worth the anguish felt by the boy in regard to the sling. It may be of interest to note that studies with rats[43] showed that binding up a limb for a period of time had no effect on laterality; forced practice, however, was able to bring about a permanent transfer in some cases. Similarly immobilizing the fractured arm of a child for a period of months in a cast or sling did not bring about a transfer of laterality unless the member became more disabled as a result of the original injury. However if restraint is considered necessary to insure consolidation, it is felt that physical restraint in the form of a sling, splint or cast is less devastating than constant nagging or punishment.

(c) *Adult influence.* This group included youngsters with all types of disabilities—symmetrical bilateral, differential bilateral, and unilateral —who experienced no real difficulty with laterality itself, but whose problems resulted from misunderstanding and pressure applied by parents, teachers or therapists. In this category the problem was surmised to exist primarily in the eyes of the beholder. However other children have been encountered who had not resolved the confusion caused by an overzealous adult and presented real difficulties that interfered with adequate function. Problems in this area may be divided into three groups according to the distribution of disability:

1. Symmetrical lesions: The attitude that causes laterality disturbances in normal children was found to be operative in a few cases here. It was the unwillingness of a rigid, perfectionistic parent to tolerate a left-handed child, with the feeling apparently implied that it is bad enough to have a defective child and even worse if he is left-handed. This effort to prevent left-handedness resulted either in resistance on the part of the child, with consequent behavioral disturbances, or acquiescence, with attempts to use the minor side as directed although the major hand performed better, resulting in continued alternation and a delayed consolidation of laterality.

An entirely different problem was presented by a boy with a history of unilateral seizures. Efforts to train the opposite side in this severely handi-

capped youngster to avoid the stimulation of convulsive disturbances did not produce improvement in function. Laterality testing revealed that the side that had experienced the seizures was the better one. Consequent training of this major hand resulted in some increase in ability and no further convulsions to date, over a period covering four years.

2. Bilateral lesions: The cerebral palsied youngster with discrepancies in disability on both sides resulting in the establishment of some functions in the right arm and other specific skills in the left limb occasionally presented problems in this area when he came under the influence of an adult who believed in and insisted upon complete unilaterality regardless of the extenuating handicap. The reaction of the individual seemed to be again either in terms of resistance, resulting in anguish and emotional flare-ups, or accommodation, resulting either in delayed laterality consolidation or in retardation in skill development with continued use of less able equipment. Unlike the polios and others with normal early development, the cerebral-palsied subjects were not inclined to persist in the favored use of a less able limb. Once writing had been established, however, even in a more involved hand with obvious limitations that would eventually block all progress beyond a very elementary level, a reluctance to transfer this skill was noted, and conversion could be accomplished only with a great deal of support and intensive treatment, reducing the period when the child was unable to write to a minimum. This seems to speak very strongly for laterality evaluation and, if necessary, consolidation before writing training is initiated, especially in the children with mild involvement that do not usually require intensive treatment.

3. Unilateral lesions: The third group are those with clearcut one-sided lesions, who usually do not present any laterality problems at all. A great deal has been written about attempts by the child to develop the more handicapped side as the major one, resulting in disturbances in speech, behavior and in convulsions. It has been pointed out repeatedly that overuse of the involved arm in spastic hemiplegia will in some cases stimulate convulsive activity.[44, 45] Laterality problems in this group have been ascribed to a conflict between the hereditary predisposing factor and the disability; that is, it has been surmised that in these cases, where speech and behavioral problems rather than lack of unilaterality are symptomatic, the child is attempting to develop a major hand on the disabled side as a result of a strong hereditary proclivity. This view is not supported by our basic concept of the development of laterality, nor by our experience. The cases of unilateral involvement are included in the adult influence category for ample reason.

A typical example is the case of a seven year old right hemiplegic with minimal hand use, minimal speech, and emotional disturbances evidenced especially by enuresis. He was hospitalized for specific concentrated training of his normal left hand, which to date he had been reluctant to use. Within three months he developed basic skills in that hand, had learned to walk, using one crutch, developed speech, and learned to handle his hostility and frustration more adequately. His difficulty was not so much the result of interference caused by the cerebral hemisphere but rather a problem of dominant parents. They were extremely rigid, conforming perfectionists, who were very disturbed about having an imperfect child and had bent every effort to improve him. This included constant attention to the "crippled" arm, to the complete exclusion of the normal one, and constant pressure to use the more disabled hand because it was the right one. The right hand was not the major hand; the boy never had a chance to assay his own potentialities, experiment, and develop laterality. For him the normal left hand was merely the other hand. In a similar way his crude, disarthric efforts at speech were subject to constant criticism and correction with the result that he became silent. The rather dramatic unfolding of his abilities, it is felt, was a consequence of his emancipation from this superimposed pattern, with the opportunity to develop his potential abilities according to his individual design.

A similar case was included in the clinical series and at the time of the testing was found to be in the middle of a transfer from the right to the left hand. This nine year old boy was a spastic paraplegic with mild involvement in the upper extremities. When first admitted to the hospital-school there was some question about the comparative ability of his arms. He, however, initiated a spontaneous transfer. Testing a year later revealed consolidation of the transfer as well as a dramatic rate of improvement in the skill of the new major hand (150% in tracing, 100% in bead transfer) which was maintained until his discharge. Clinical examination now clearly indicated the left as the superior arm. It was then revealed that the right arm had been noticeably impaired at birth, and from that moment on had received constant care with splinting, massage and exercise. He was repeatedly enjoined to use it and attention was constantly focused on it. The right was his only arm; there was no chance to explore and develop the potentialities of the left limb until he was emancipated from the constant parental concern. Again the preoccupation with the more disabled arm, especially since it was the right one, resulted in an adult-induced laterality problem.

Therapists as well as parents tend to overemphasize the more involved arm, usually because they

feel that they are obliged to reduce the handicap. Experience has shown, however, that direct concentrated attack on the more involved limb does not necessarily result in improved function and often elicits serious complications.[46, 47] Overtraining of the normal or better arm, with the disabled one definitely relegated to an assistive capacity, has brought more satisfactory results.[48] Even when other difficulties did not appear, direct concentration on the "bad" arm appeared threatening to many patients, and cooperation and diligence were often lost. In one case, where work with the involved arm evoked evasive, apathetic and moody behavior in an otherwise industrious and cooperative child, concentrating on the good hand while requiring only relative relaxation of the disabled one resulted in actual measurable improvement of function on the more involved side.

Considering the individual as a whole, with certain overall needs and potentialities to be encouraged and developed, rather than only a badly deformed or disabled arm that requires correction, seems to be an attitude that may go far toward preventing the creation of laterality problems from the outside when none need to exist.

Enforced Transfer

It may be noted that in no instance was an enforced complete transfer of laterality encountered or advocated. It has been assumed that if laterality is established no problem exists, and there can be no reason for interference. In no case where improvement in speech occurred could the improvement be ascribed solely to consolidation of handedness. As in the case cited earlier, other factors seemed at least as important as this one. Of three cases diagnosed as aphasias included in the series, one had clearcut right unilaterality with symmetrical involvement, while the other two were discrepant cases, one achieving consolidation and the other not, with no noticeable change in ability to speak.

It is felt strongly that an arbitrary decision imposed on the child may only by chance and in a few instances offer a satisfactory solution to his problem, and in many cases may prove therapeutically untenable. The cues must be obtained from the child not only in regard to his disability but also in terms of what he can and does use. This is of especial importance in cases where the lesion occurs after laterality is established since factors other than the disability itself seem operative, and also in cases of cerebral palsy with extrapyramidal lesions who comprise 60-65% of the problem cases found. Here it is practically impossible to assay the handicap, consisting of a variable lack of inhibition and control of motion, and only the individual himself can appreciate and express what combination of forces is more effective and efficient.

Although consequential errors can be made in the handling of handedness problems, it is felt that laterality is not a factor that should excite tremendous anxiety and drastic action. In fact it is the excitement and the drastic action that cause many of the problems. On the other hand leaving a child to welter in his handedness difficulty is not in the best interest of his development and is therapeutically unwise. A calm appraisal of the facts, and considered action based on this, carried out firmly and consistently, offers the most effective solution.

It is hoped that the development of the test battery will give occupational therapists a more precise and practical instrument with which to obtain information upon which the physician and the therapeutic team can base their decision concerning approach to the solution of specific laterality problems. In those cases where no problem is found to exist, the results of the tests may point out to all who are concerned with the child what his laterality pattern is and what he may be expected to use, minimizing arbitrary interference with established laterality. Finally the tests may provide the physician and other researchers with information to correlate with other findings that may eventually lead to a greater understanding of certain disabilities, especially those involving brain lesions, as well as an elucidation of the very enigmatic complex entity that is laterality.

SUMMARY

In recognizing the need for a better understanding of laterality by occupational therapists, the initial effort has been made to evolve, through the thoughtful digestion of the pertinent literature, a workable basic concept.

Laterality, an expression of the asymmetry of higher function peculiar to man, appears basic to and closely interrelated with the development of fine skills. This asymmetry is found to be primarily cortical. It involves the association areas concerned with the elaboration of manipulative hand use, language and visual direction, culminating in the complex skill of writing. The hemisphere in which these areas are active, as well as the contralateral hand and the sighting eye, are termed "major"; the hemisphere, hand and eye that do not develop these highly specialized functions are the "minor" ones. Laterality is considered an acquired skill that develops on one side and to a specific degree as the result of a predisposing hereditary factor. As the child matures he develops through constant practice the patterns that represent both laterality and competence in high skills.

Injury or impairment at birth or during childhood may impede the normal development of laterality and cause problems, the successful solu-

tion of which is essential to the best utilization of the child's potential ability.

A battery consisting of two habit items, one preference test and four skill tests, each of which is unquestionably involved in laterality and sufficiently reliable, has been developed and evaluated on selected subjects in various diagnostic groups. In combination with numerical indices of disability it seems capable of indicating with reasonable accuracy on which side and to what degree handedness or the potential for greater ability is located, where problems exist, as well as defining their nature and pointing toward solutions.

These tests were found to be valid only when they challenged the individual; those which were within the scope of physically handicapped children were found unreliable with normal and manually non-handicapped youngsters, rendering these groups useless in the standardization of tests.

Impediment to the development of normal unilaterality, the impact of the handicap on already existing handedness, as well as interference by adults caused problems that could not arbitrarily be resolved in terms of the nature and extent of the disability even in cases where this could be readily assayed. Solutions in all areas were found by defining the problem, usually through testing, helping the child to find the best pattern for the development of skills in terms of his individual abilities as well as his handicap, and finally, consolidating this pattern of laterality through support and specific training.

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THE HOME VISIT IN A CEREBRAL PALSY TREATMENT PROGRAM*

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The usual pattern of care for children with cerebral palsy, as it is developing in the United States, is for the child to remain at home with his parents except where mental retardation is so severe that institutional placement is necessary. For these children who remain with their families, the community is beginning to make available an increasing number of opportunities for treatment and training. Training may proceed in a hospital clinic, in a treatment center outside of a hospital, or in a school, but wherever it takes place it is essentially the same in basic goals. In each instance the program must be geared to the individual needs of the child and to his particular restrictions and abilities. A large part of the program is devoted to developing the best use of the child's existing abilities, but he is also helped to develop new skills. The ultimate goal is complete independence in self care, the achievement of freedom in sitting and walking, and the development of coherent speech. Exercises are oriented toward the practical tasks of walking, feeding and dressing, and caring for personal needs. It is anticipated that this fundamental learning program will help the child move on to a more complicated educational and social program.

It is obvious that if independence in function is the ultimate goal, then training should not consist of routine mechanical exercises unrelated to life experience, but should be part of the normal pattern of a child's daily life. Ideally, there should be no real difference between the child's activities in the training situation and what he actually does in his home. Consistency in treatment and handling are basic needs of every child, but for the handicapped child the need is even greater since his learning is slow and is, even more than in a normal child, the product of continued duplication of experience. Yet those who work with the cerebral palsied child recognize that there is often little transfer of skill from formal therapy to the actual living situation. Mary is quite skillful in opening the buttons of a doll's dress, but entirely unable to undo her own. John may show real skill and coordination in building a toy airplane in occupational therapy, but remains helpless when he must open a zipper or feed himself. Robert stands and walks independently in the physical therapy room but at home or out of doors he can do neither, and will not even tolerate being left alone.

In an effort to improve our program for each child in a school for cerebral palsied children it was proposed that a visit be paid to the home of every child to determine what part of the therapy program was being carried over into the living situation. On the other hand, it was agreed that if more were known about the actual living pattern the staff might be better able to plan the child's school program. The staff also felt that where there was an inadequate carry-over of school accomplishments into the home situation, a home visit might clarify the reasons for such failure. The following account of our experience may be useful to others working in a treatment program.

In planning the visit we made clear to ourselves that the object of the interview was to gather information which could only be obtained by a visit to the home. It was agreed that the interview be clearly defined and limited in order that it not present a threat to parent or child. There would be no attempt to use the interview to explore problems other than those related to the school program unless the parent chose to do so. However, we were aware of the fact that some parents might wish to use this opportunity to discuss larger problems, and we felt that they should be offered the opportunity if they so desired.

The social worker was chosen to make the visit because of her special competence in interviewing and because it was felt that she could interpret to the staff the significant material which she would obtain. It was also anticipated that she would continue work with those parents who indicated a desire for further discussion.

The staff requested specific information which they thought would be helpful in planning for the child's training. Much of this was very precise: how many steps have to be climbed before entering the home? How is the child transported for recreation and where does he go? Where is the toilet located, and how does the child use it? In what room and at what times does he eat? Does he eat alone or with other members of the family? Do friends visit him in the home? Does he read or write at home? Does his speech pattern differ in the family setting?

It was important to know how the child spent all of his time. How much was spent in passive

*Based on an experience in a school for cerebral palsied children supported by the New York Service for Orthopedically Handicapped in New York.

activity like listening to a radio or watching television, and how much to actual participation in family living, both in the sharing of responsibilities and in recreation.The availability and utilization of community resources was also of importance.

Although our questions were not framed directly for the purpose of increasing our understanding of the emotional components of the parent-child relation, we were to learn that simple inquiries like "where does the child sleep?," "where does he eat?" were to give us a far better understanding of the child's role in the home than we had been able to secure in the past. Out of this interview was to come a deepened understanding of the child and his family.

Each family received a letter describing the purpose of the interview, and the time of the visit was arranged by telephone at the convenience of the mother. Most of the parents found it easy to understand why it was important to relate the treatment program to the home program, though some needed reassurance that the visit did not imply a criticism of their way of handling the child. Some asked why this kind of visit had never been made before. Some for the first time raised questions as to the adequacy of the learning program received at school. Several asked for, and received, an opportunity for further discussion with the social worker about problems of importance to them.

Twenty-four families were visited. The social worker saw all the mothers, several fathers, most siblings, and relatives who shared the home. A visit lasted about two hours and was usually planned to allow a period alone with the parent before the child's return from school. In this way there was an opportunity to see the child on his return from school and to observe how he was brought into the home and the arrangements for his activity after the school program.

After each visit a detailed report was prepared for the use of the entire staff and the interview was discussed with the staff members working most closely with the child. Changes were thereupon made in the individual school programs on the basis of the home findings. In most instances, a follow-up interview with the parent was held in the social worker's office to discuss the changes in school and home program which had been recommended by the staff as the result of the visit. Specific recommendations were made in relation to the child's program at home, and were interpreted to the parent in relation to the ultimate goals for the child.

On reviewing the findings of our home visits, it became apparent that in most homes there was only a limited use being made of the skills learned in school. On the other hand, many homes had special needs and difficulties which had been unknown to the school and which had not been considered in planning the child's program. Knowledge of the handicapped child's role in the family was essential in the planning for his school and treatment program.

On analysis, there seemed to be three general reasons why the school program had not carried over into the home. These were: (1) parental lack of clear understanding of the program and goals of training; (2) difficulties in the home situation itself which made it hard or impossible for the parent to carry over the program; (3) emotional disturbances in the parent-child relation which interfered with carry-over.

1. *Lack of information about the program and its objectives* was shared by many of the parents. This reflected inadequate planning for parent guidance in the school's program. Certain parents did not understand the meaning of a particular activity, and occasionally did not even know that the child had developed skills which he should be expected to use at home. This was especially true of mothers who were unable to visit the school either because they were employed or had other children at home to care for. Fathers and grandparents were almost completely out of touch with the school program and when they shared responsibility for the child's care they often continued to give services which encouraged the dependency that the school was trying to eliminate.

Examples were numerous in our group:

Tom was being helped at school to develop independence in toilet care. At home he was not encouraged to use the toilet, but a urinal was used. After the differences in handling were discussed with the mother, independent toilet care was carried on at home.

* * *

Bob's learning program in school included reading material on an 8 year old level, but at home his few books were on the nursery or kindergarten level. Bob's teacher now began sending books home with him.

* * *

Phil was increasing in self care at school, but there was no carry-over of these activities by the grandparents who supervised his care and who still maintained the same program of assistance as before he entered school. The social worker now arranged a series of interviews to interpret the program and arranged for both grandparents to spend time at the school observing Phil's activities.

2. In many instances *the home situation was not conducive to the carrying out of the learned skills.* In some situations there were difficulties in the management of the handicapped child which made it impossible to carry out a recommended program. In other situations, the family's desire to carry out the program had resulted in too serious changes in the pattern of living of every member of the family group. Such difficulties were especially apparent in the families of older cerebral palsied children whose increased weight and size had made problems of transportation, lifting and personal care extremely difficult.

Most families we visited did not live in a ground floor or elevator apartment. In order to attend school each day the child had to be carried up and down the stairs. In three families, this meant carrying the child four flights. Outdoor activities, socialized experience and the use of community facilities were impossible in such situations.

The tricycle which we had helped procure for 11 year old Phil was largely unused because his grandparents found the burden of carrying him up and down four flights of stairs extremely difficult. For the same reason Phil had little contact with neighborhood children although he loved social activity and in school profited greatly from it. Helping the family plan for new housing became an important part of our program.

* * *

Richie was found to be living on the fourth floor of a tenement house. His ailing mother carried him up and down stairs at least once daily. In his mother's eyes, Richie's ability to climb stairs was his most important learning goal, but this had not been known to the school staff. A new PT program was instituted, focused upon this need.

* * *

Overcrowded living arrangements made it difficult to bring Sally's special chair into the kitchen where her family ate. For this reason she had been fed alone in the living room or in the bedroom before the others sat down together. The meaning of this separation was discussed with Sally's mother, who was able to make other arrangements.

Outdoor recreation for the family group was dependent on the means of transportation available for the handicapped child. For the larger children, subway or bus travel was impossible and few families had access to an automobile.

Joan had outgrown her baby stroller and for this reason was no longer taken to see relatives and friends and had discontinued visits to park and library. Joan and her mother never participated in any family excursions.

In general, our impression was that the physical strain and difficulties in caring for a very handicapped child were great in every case and became increasingly more severe with the child's advancing years. The burden on the entire family, emotionally and physically, seemed so great that it was doubtful whether after a certain age the home was actually the best place for some of our severely handicapped children who had acquired no independence in locomotion or self care. But community facilities for the severely handicapped cerebral palsied child outside the home were few and most parents had no recourse but to carry on to the best of their ability as long as their strength held out.

Laura's parents had planned every phase of their own activity and home living around the needs of the severely handicapped daughter; Laura was now thirteen years old and the physical assistance which she needed in toileting, ambulation, etcetera was putting a great strain on her parents and sister. In the absence of any other recourse they were anxious to continue a school's program with its emphasis on a kind of independence which she could never achieve.

We did not find lack of special therapy equipment a significant factor; most families had been provided with special chairs, tables, etcetera. It was our impression, in fact, that the home which emphasized equipment tended to place too much value on it and was not adequately concerned with involving the child in a social activity program.

Don's home was full of special equipment constructed by his father and designed to help him stand independently. Since Don's inability to stand was related as much to anxiety as to his lack of physical ability, the presence of special equipment was not helping solve his particular problem.

3. A third and equally important factor which prevented the carry-over of the school program into the home related to the *feelings of the parents toward the child, and the child toward the parents, and the role of the handicapped child in the family group.* Many mothers and fathers had difficulty in following the school's recommendation to encourage independent function, and preferred themselves to serve every need of the child. Some children who were achieving a degree of competence at school relapsed into an infantile role as soon as they came home.

This was strikingly demonstrated with 8 year old Jenny who in school was encouraged to use sound meaningfully but at home communicated with her mother by the movement of her eyes and changing facial expressions. The mother could be seen ignoring the child's efforts to use speech, anticipating every need without waiting for Jenny to express her own wishes.

* * *

In school Eva often helps the more handicapped children with their meals or with their school work. At home she is dressed and undressed, is often fed her meals, and is never asked to assist in any of the simple household tasks which she could easily do, like drying dishes or dusting. Her mother comments, "Nothing is important if she doesn't learn how to walk."

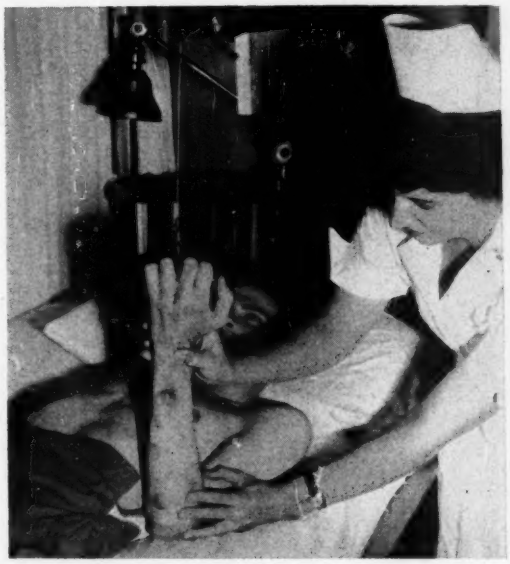
In staff discussion it was felt that such parental patterns of overprotection and resulting infantile behavior were often but not always indications of a personality problem. Overprotective behavior is closely related to the experience of living with a child whose development is delayed. The period of infantile dependency in most cerebral palsied children lasts for months or even years beyond babyhood. This infantile relation is not preferred by the mother but is demanded of her by the condition of her child's handicap. Lifting and carrying are tasks which must be carried on for years. Feeding by the parent is often necessary even for an adolescent. Our own group of children were for the most part seriously handicapped, and assistance with lifting, feeding and dressing were necessary to a degree. The child himself might find greater satisfaction being cared for than helping himself. Where muscular effort and intellectual concentration are necessary to bring food to

(*Continued on page 276*)

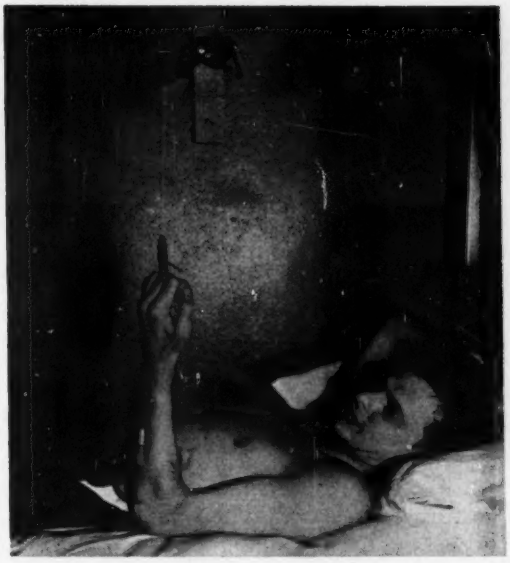
EXERCISE TO DEVELOP RANGE OF MOTION OF THE FOREARM

Supination and/or Pronation for Patients in Bed

LOTTIE V. BLANTON, Captain, WMSC*



Occupational therapist assisting patient in maintaining the correct position for increasing supination of the forearm.



Patient, Brooke Army Hospital, July, 1953, using supination-pronation divise for twisting silver wire. Patient is in bed with Balkan frame.

The featured apparatus was developed at Brooke Army Hospital in 1951. It has been used successfully in the treatment of bed patients requiring increase in range of motion of the forearm. The Korean veteran pictured here is confined to bed because of a fractured femur in addition to injuries of the left upper extremity.

The occupational therapist received a prescription to increase the range of motion in all joints of the patient's arm, forearm and hand. Featured here is the patient engaged in exercise to develop supination of the forearm.

The apparatus consists of a vertical bar attached to the overhead bar of the Balkan frame by means of a standard Balkan frame C-clamp. A standard one and one-half inch bench vise is attached securely on the vertical bar. A piece of 16 B&S gage sterling silver wire is stretched between the vise and the T-bar vise. (The T-bar vise is made from the nose of a fly-tying vise with a T-bar welded on to the end).†

The patient holds his arm parallel to the side of his body and flexes his elbow at a 90° angle. He grasps the T-bar vise. He supinates his forearm and thereby twists the silver wire clockwise. Later each piece of the twisted wire is coiled into a link for a bracelet.

*Brooke Army Hospital, Fort Sam Houston, Texas.
†Devised by B. Levy and H. Ericksen, BAH, 1949.

In Memoriam

Miss Susie M. Brooks
Watertown, Mass.
Deceased 1954

Miss Florence Magilton
Orlando, Florida
Deceased April, 1954

Mrs. Mary Satterfield
Clifton Springs, N. Y.
Deceased May 30, 1954

THE CARSON CART

HARRIET H. WARREN, Capt., WMSC
Occupational Therapy Section
United States Army Hospital
Camp Carson, Colorado

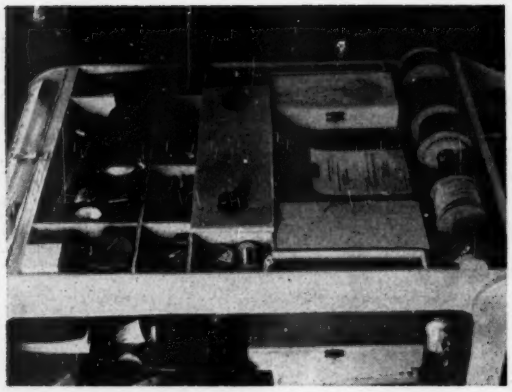


Figure 1

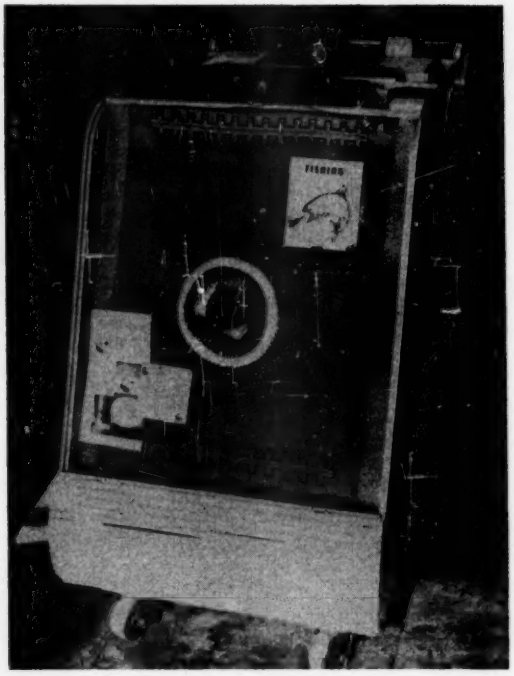


Figure 2

Cognizant of the need for and the deficiencies of ward carts used by occupational therapists to transport equipment and supplies to the patient being treated on the ward, two occupational therapy technicians at U.S. Army Hospital, Camp Carson, Colorado, have designed the cart pictured. Having used three of these carts since late in 1953, we have found them to be most satisfactory and feel now that other occupational therapy departments might be interested in constructing these carts for their own use. A working diagram is, therefore, presented for your information as well as four photographs of the completed cart.

Building materials necessary for the construction of one cart are listed below:

2 Pc ¼" Plywood 29½" x 40" (sides)
1 Pc ½" Plywood 20½" x 29½" (back)
1 Pc ½" Plywood 20½" x 38½" (front)
1 Pc ½" Plywood 20½" x 36½" (bottom)
1 Pc ½" Plywood 20½" x 30½" (middle shelf)
1 Pc ½" Plywood 20½" x 25½" (top shelf)
1 Pc ¼" Plywood 11½" x 20½" (pattern rack)
1 Pc ½" Plywood 10 x 7½" (handle brackets)
1 Pc ¼" Plastic 24" x 20" (showcase window)
1 Pc ½" Plastic Dowel 19¾" (spool rod)
1 Pc 1" Wood Dowel 22" (handle)
1 Pc ⅛" Cork 32½" x 20" (showcase)
1 Pc ⅛" Cork 24½" x 20" (top shelf)
2 Casters, 5" Stationary (back)
1 or 2 Casters, 3" Swivel (front)

The above list does not include hinges, bolts and small hardware items. Also partitions on the top of the cart (Fig. 1), made from scrap pieces from the shelves, are not included in the list.

In addition to pictures and diagrams we feel that further explanation on construction of various parts might be helpful. Nowhere have we pictured the bottom of the cart to indicate the attachment of castors. In order to assure a smooth-running, easily-wheeled vehicle, we suggest the use of two five-inch stationary castors with rubber tires, mounted on a two-inch by four-inch board, placed four inches from the rear and two inches from each side. One or two three-inch swivel castors with rubber tires, mounted on a two-inch by six-inch board, can be used for the front. We have one with two castors in the front and two carts with one castor centered from the sides and set back from the front about three inches. Although all three carts have given no trouble in balance, the one with two front castors is steadier than the others. Sponge rubber was placed between the castor plate and cart bottom and rubber was wrapped around the bolts that secure castors to the cart so that noise would be eliminated.

Our pictures (Fig. 2 and 3) show wood dowelling in the front. This was the first cart to be constructed and on the next two carts, sheet aluminum was found to be much more satisfactory both from the standpoint of construction and durability. We would also advocate small rubber bumpers or guards.

Some difficulty was encountered in bending the plastic for the front of the showcase. It was heated with an acetylene torch and bent around a cylinder to give the desired curve. The torch was held so that the flame just barely touched the plastic and the flame was moved rapidly across the part to be bent in order to prevent burning. It was a long and tedious job to get the desired curve since the entire part to be bent had to be heated evenly. Instead of bending the plastic, the front top corner could be squared off and a flat piece of plastic used for the window.

You will notice from Figs. 1 and 4 that the leather lacing spools have been slipped on to dowelling and that the lacing end of each spool is held in place securely. Securing the lacing in such a manner was accomplished by means of one long strip of wood hinged at one end of the back piece of the cart. A one-quarter inch cork strip was tacked to the top of the back piece and heavy felt nailed to the long strip of wood so that when the strip closed down over the lacing ends and the wood strip clasped securely, lacing could be easily drawn from the spools but still remained between the felt and cork padding.

From the top view (Fig. 1) you will notice containers for steel wool, slots for sandpaper squares, various sections for tools and miscellaneous boxes and jars for small items. Although not pictured here, three-quarter inch strap iron was bent to hook over one side of the cart and angled to carry a rug frame. We might also mention that the shelves are supported by one-inch strips of wood and that the handles can be tilted up or down when securing side pieces. We painted the carts a warm gray and, rather than paint occupational therapy on the side or use an occupational therapy emblem with caduceus, we lettered occupational therapy on a white cardboard strip and use it in various positions in the showcase, depending upon our display.

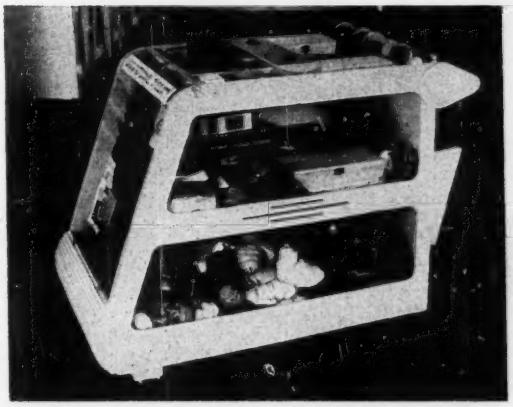
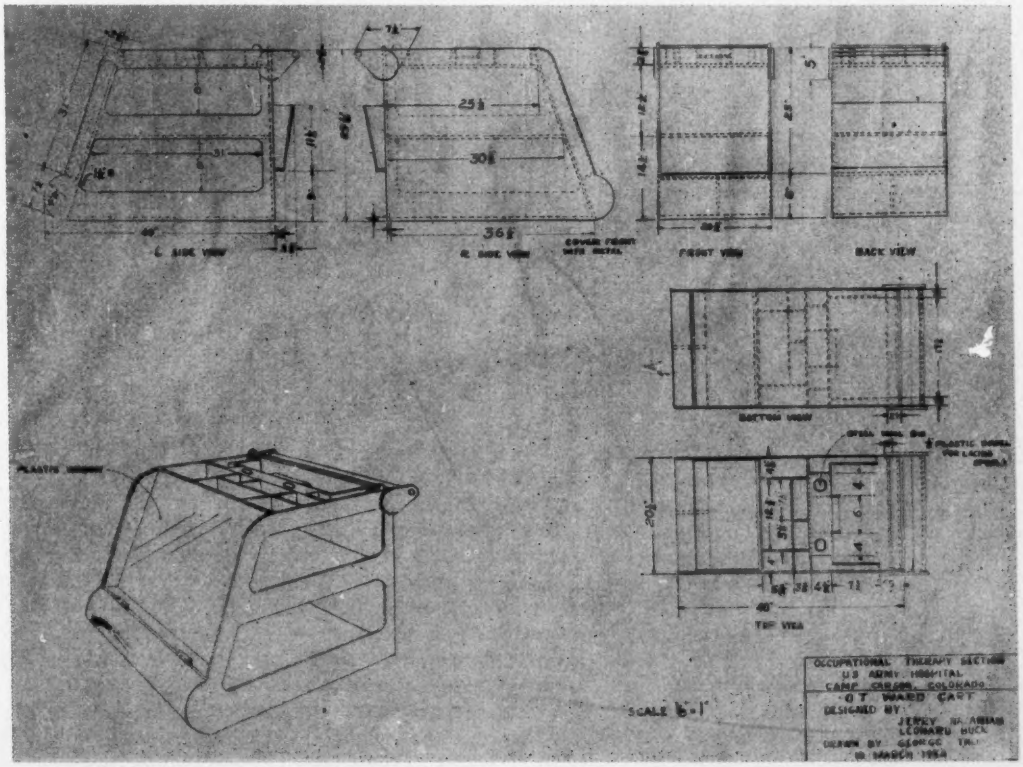


Figure 3

(*Continued on page* 277)



TOOL HOLDING DEVICE FOR A QUADRIPLEGIC PATIENT

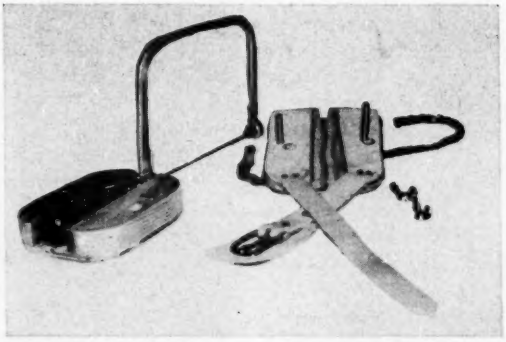
KARL L. IRELAND, O.T.R.

In order to provide meaningful activity in the occupational therapy program for a young steeplejack, quadriplegic following a fall into a water tank, the device pictured was constructed by the therapist. It enabled the patient to use a coping saw, seven ounce hammer, wood files, dowel-mounted sandpaper and similar tools with a fair to good degree of success.

Quadriplegic patient uses 7-oz. hammer in the device to drive finish nail steadied with pair of long nose pliers by therapist.

Construction is very simple: four blocks of light weight wood are mounted on two pieces of quarter-inch plywood so as to provide a tapered receptacle for the tool handles, and are clamped together with quarter-inch stove bolts and wing nuts. Overall size of the holder is approximately four inches wide by five inches long by two inches thick. A slot in the upper piece of plywood guides the coping saw frame in an erect position. A leather cuff is laced tightly over the hand, and a pair of straps is crossed over and around the wrist to keep the device from slipping off when the arm is drawn back against the resistance of a saw or file. Top surface of the block is padded to protect the palmar surface of the patient's hand.

If this patient's wrist extensors had graded less than good, a light weight splint could have been added to extend up under the forearm and to support the wrist in a neutral or slightly cock-up position. Total cost of the device was less than twenty-five cents, plus the therapist's time in construction and experimentation.



Open view shows tool handle fitted into tapered slot. Covering piece is secured with wing nuts. Straps cross over and around wrist. Leather cuff laces over back of hand.

Through achievement of a fair degree of success —even on such a low level—in a masculine activity which he had decided was obviously closed to him, the patient was brought up a few notches on the scale of self-confidence and willingness to do-for-himself. It was felt that this effect carried over to some degree into the areas of self-care and of interaction with the patient and staff group in the occupational therapy shop.

San Francisco, the city by the Golden Gate, is to be your next conference site, October 22-27 are the dates, the famous Palace Hotel, the headquarters.

All of you who attended the Washington conference know how stimulating and worthwhile the meetings were and will therefore plan to attend the 1955 conference. You who were unfortunate enough to have missed this year's excellent conference should definitely plan to attend the one in California next year.

The Northern California Occupational Therapy Association has been working for six months on plans for a stimulating series of meetings. There will be time out for sight seeing and fun. Plan your 1955 vacation now to include the San Francisco conference with side trips to Carmel-by-the-Sea, Yosemite National Park and Lake Tahoe. Maybe you want to stop in Reno and try your luck at the wheel. Could be you'd make expenses!

Watch your future AJOT's for conference personalities, institute and program plans as well as special events. We will try to show you such a good time that you will learn to love San Francisco as we all do.

NATIONALLY SPEAKING

From the President

Where are we going? The reports given at the opening session of the annual conference speak far more eloquently of the healthy state of the American Occupational Therapy Association than a president can describe in oration. They stand as evidence of a fruitful year for occupational therapists across the country. With even greater significance they reveal an open-hearted, heads-up attitude toward the future.

We are engaged in an interesting and challenging pursuit. It is a privilege to work within the concept of medicine and contribute to the welfare of our fellow man.

Last year we "refined our resources" at the Texas conference. This year we "capitalized your resources" in Washington. In each instance we must know our resources to act upon them. Let us stand off and view them with critical perspective.

Medical direction is the basic principle under which occupational therapy has worked since its inception. Our program is no good unless it is directly related to the medical plan and carried out as a component part of the doctor's program for his patient. This we know. To fulfill the demands of such a program the occupational therapist must be fully aware of his tools and know how to handle them. Our tools are fashioned from the substance of three fundamental facts.

One established fact is the physiological value of body performance. The human body is made to function. There is cellular stimulus from so doing. Therefore the patient's act of performance, mental or physical, becomes one of the clinical tools we offer. Our selection and guidance of that performance is the professional skill the therapist has been trained to use. This requires a critical analysis of the patient's need.

The second basic fact is the constructive stimulus of a consuming interest. Interest is the dynamo that drives the individual into action or the sedative that quiets his nervous excitement. We need a high awareness of how best to apply this therapeutic agent. It is a valuable but elusive clinical tool.

The third fundamental fact on which occupational therapy is built is the feeling of well-being that can be brought about through interpersonal relationships. As human beings, people act according to the way they feel. Their inner status has a direct bearing on recovery. This intangible substance in all of us is susceptible to our relationships with other people. As a therapeutic tool, interpersonal relationship becomes very meaningful. The occupational therapist has clinical opportunity to bring this into force through an understanding of the mechanisms of behavior.

These tools of occupational therapy are of value only in the refinement with which they relate to medicine. Medical direction is very important to us; it has guided our development to date as it has guided our clinical procedures. It will continue to chart our future.

The response of the medical specialty groups to our invitation to appoint a representative as a member of our medical advisory council is most gratifying. Acceptance was unanimous. A group of prominent and busy doctors has not only been appointed but is willing to sit in conference with us and become an active part of our further development. The first meeting of this group, with full attendance, sat in session all day October 19, and attended the opening session of the conference to hear us report on our year's accomplishments. You will recall from earlier announcements in AJOT and the *Newsletter* that they are:

Dr. H. R. McCarroll, chairman of the liaison committee to medical and ancillary specialties, St. Louis; American Academy of Orthopedic Surgeons

Dr. Ralph E. Moloshok, New York; American Academy of Pediatrics

Dr. Alex M. Burgess, Providence, R. I.; American College of Physicians

Dr. Leonard E. Evander, chairman of committee on rehabilitation, Lockport, N. Y.; American College of Chest Physicians

Dr. Robert S. Myers, Chicago; American College of Surgeons

Dr. Benjamin Simon, chairman of medical rehabilitation committee, Arlington, Mass.; American Psychiatric Association

Dr. Donald L. Rose, Kansas City, Kansas; American Congress of Physical Medicine and Rehabilitation

Our job now is to continue to refine our therapeutic tools for use in clinical procedure. The mechanics through which we can do this are the committee structure of our organization. Heed the call; contribute your share and enjoy the rewards of an ever growing profession! This is where we are going.

Henrietta McNary, O.T.R.
President.

From the Staff of the
AMERICAN JOURNAL OF
OCCUPATIONAL THERAPY

From the Education Office

In accordance with the procedure relative to the registration examination as published in the March-April issue of AJOT (Vol. VII, No. 2, 1953) the education office is pleased to announce those examinees who successfully passed the June, 1954, registration examination.

Abel, Hazel M. 12
Abella, Mercedes 12
Acuzar, Patricia C. 27
Adams, Ann L. 1
Adams, Dorothy F. 3
Allen, Janet E. 15
Applestine, Bettye 14
Arnold, Judith F. 27
Aurell, Patricia A. 5
Avery, Jacqueline A. 18

Baird, Dorothy A. 14
Barrett, Lorna J. 4
Bates,* Elaine 10
Baumann, Jane C. 8
Beech, Patricia L. 22
Bell, Esther B. 19
Bengson, Evelyn M. 15
Bergeron, Gisele 1
Bierma, Alice A. 6
Blech, Lois E. 1
Boernke, Marion J. 23
Boyd, Barbara M. 23
Boyer, JoAnne M. 18
Brinkerhoff, Ruthan 27
Brown, Beverly J. 18
Brueggemann, Carolyn 23
Brunt, Beatrice 12
Bucher, Yvonne 14
Buhrer, Irene F. 11
Burdick, Ferebe I. 18
Burger, Corinne 22
Burns, Barbara L. 20
Burrows, Patricia J. 18
Buskirk, Martha A. 1
Butler, Helen F. 19

Calkins, Martha H. 1
Calleri, Luane 18
Carlson, Helen A. 25
Carr, Roberta 11
Caspersen, Joan E. 12
Chermak, Janet B. 8
Chrobuck, Mary C. 18
Codman, Elizabeth 1
Colburn, Marilyn J. 11
Colpak, Judith A. 1
Combs, Mary H. 22
Comolli, Joan 11
Cramer, Joanne 23
Cuyler, Mary H. 18

Dack, Jack J. 25
Daller, Marlee C. 14
Dargan, Frank P. 100
Davenport, Mary N. 22
Day, Donna J. 18
Dean, Ferne M. 22
deLude, Mary Ellen A. 2
Denning, Marjorie A. 24
Derby, Alice M. 8
Deutsch, Jean M. 22
Dick, Doris J. 26
Duffy, Eleanor M. 1

Eckhardt, Miriam R. 22
Edmonston, Jean 16
Edris, Marilyn 13
Edwards, Alice 19
Edwards, Edith M. 14
Ellifrit, Jeannie A. 5
Endress, Jean K. 9
Eppstein, Miriam C. 26
Erlandson, Lois L. 9
Espersen, Mary L. 9
Everson, Edith 10

Fairchild, Margaret 24
Fessenden, Bruce 1
Fine, Leatrice 22
Fleming, Marilyn L. 14
Fullerton, Donna 23
Futhey, Lena E. 13

Ganther, Marjorie 23
Garland, Claudette 9
George, Margaret J. 23
Gilbertson, Joan B. 23
Glasser, Estelle 12
Gouget, Marjorie A. 8
Gouin, Mary G. 16
Gramling, Edith 10
Griffin, Patricia A. 3
Griggs, David F. 9
Griswold, Elizabeth A. 1
Gurney, Glenna W. 11

Hadeen, Barbara F. 24
Hall, Marion R. 1
Hallman, Jacqueline L. 14
Harder, Judith G. 7
Harris, Donna L. 6
Harrison, Jean M. 18
Haskell, Barbara J. 8
Hawthorne, Joan 19
Hayes, Elizabeth 18
Heath, Ellen M. 22
Heiman, Nancy C. 14
Hockett, Joan 9
Hoeper,* Joyce A. 9
Homrighausen, Betty 8
Hopkins, Muriel K. 4
Horton, Harriette J. 2
Hovland, Carol I. 8
Hutchinson, Elizabeth 8

Inveen, Shirley M. 15

Jacobsen, Marilyn 23
Jaffee, Elaine R. 14
Jaworski, Helen 3
Jones, Rex M. 18
Jose, Shirley A. 25

Kaseman, Betty M. 18
Kassowitz, Marlis 23
Kauffman, Yvonne 15
Keirnan, Mary L. 4
Kenney, Mary A. 10
Kersten, Doris 23
Kitchen, Beryl 22
Koonce, Dorothy H. 2
Krippendorf, Carl 23
Kuhlmann, Jean E. 13

Lamote, Francoise 19
Larson, Jane E. 4
Larson, Jane E. 9
Lellep, Nancy 23
Lillie, Maxine D. 25
Lin, Genevieve 15
Lindsey, Lois M. 19
Llewelyn, Eve J. 19
Lovegrove, Delores 22
Luckenbill, Marianne M. 14
Lyon, Phyllis A. 20
Lysen, Beverly L. 9

McCann, Marie L. 1
McClelland, Sylvia A. 18
McGann, N. Kaye 23
McKinzie, Lisetta M. 11
McKnight, Nancy E. 27
McLeod, Myrna J. 17
McMahon, Sheila 11
Marofsky, Jacqueline S. 9
Matsushige, Harris N. 19
Matthews, Nancy L. 1
Melchior, Mary L. 14
Menning,* Florence E. 23
Mericle, Carolyn R. 25
Miller,* Patricia R. 27
Mollhagen, Janet L. 4
Moore, Barbara G. 25
Moore, Jean 24
Murphy, Kathleen D. 22
Murphy, M. Constance 2
Murphy, Suzanne L. 1
Murray, Sue E. 14

Nulf, Janet L. 4
Nutting, Lois 6

Odegaard, Nancy L. 23
Osborne, Anne 2

Page, Ruth M. 9
Palmer, Jeanne M. 18
Parker, Joyce H. 1
Perkins, Sue H. 16
Perley, Mary A. 11
Perlman, Patricia B. 12
Pifer, Ellen J. 6
Pixley, Marie V. 1
Plaisted, Patricia A. 11
Plimpton, Esther E. 11
Plum, Ruth M. 9
Poirier, Patricia G. 1
Polasik, Wilma B. 19
Poli, Mildred E. 1
Porter, Carol J. 27
Porter, Geraldine T. 1
Potter, Diana 1
Powell, Martha V. A. 1
Prouty, Dorothy 20
Pullman, Elizabeth D. 16
Pumphrey, Pattie E. 14

Randlett, Florence G. 20
Ratcliff, Roselyn 1
Rawe, Donald E. 16
Reckitt, Lisette N. 8
Reines, May M. 12
Renigar, Constance L. 27
Rerek, Margaret D. 12
Reynolds, Patricia A. 18
Rodriguez, Ana L. 27
Rodriguez, Rose M. 27
Roseboom, Margaret F. 8
Rosensteel, Barbara A. 27

Saari, Marilyn C. 22
Sahs, Mary L. 25
Schommer, Carol J. 23
Schultz, Margaret E. 8
Schumacher, Elizabeth 8
Scott, Kathleen R. 18
Shaw, Nancy B. 1
Sherman, Edith J. 19
Sherman, Margaret J. 1
Shields, Elizabeth A. 1
Sicard, Clarence A. 9
Shim, Barbara D. L. 22
Simenson, Katherine G. 23
Skillen, Mary 14
Smith, Donna L. 13
Solie, Gerald A. 22
Sorlie, Eloise J. 19
Speck, Joan W. 18
Sotan, Janice 3
Stanforth, Betty J. 13
Stauffer,* Donna L. 9
Stevens, Rhoda P. 11
Strattman, Eunice S. 23
Street, Dorothy R. 1

Talbert, Suesetta 26
Tanaka, Leilani 24
Taylor, Beverly J. 3
Taylor, Cornelia W. 1
Teska, Ann 12
Thoke, Clara M. 8
Thompson, Joan M. 4
Treneman, Beverly B. 25
Tucker, Marjorie 2
Tucker, Myra 18

Utley, Elaine R. 13

Van Allen, Ann 11
Vellani, Sonia T. 19

Wagner, Adele 1
Ward, Faith 12
Warren, Ellen H. 9
Watari, Sumiye 9
Weaver, Jean C. 11
Weinmann, Ramona E. 24
Weiss, Charlotte 12
Welch, Mary L. 12
Wetteroth, Barbara M. 18
White, June M. 5
Wiley, Carol B. 1
Willard, Marion L. 1
Wilson, Carole 9
Winters, Helen R. 18
Wooley, Margaret A. 22
Wong, Helen 23
Woodburn, Jane S. 25
Wright, Dorothy A. 4

Yeaton, Marion T. 1
Young, J. Naomi 14

Zeigler, Patti A. 13

*Completed with honors

CODE NUMBERS FOR OCCUPATIONAL THERAPY SCHOOLS

Boston School of Occupational Therapy	1
Colorado A. & M. College	24
Columbia University	2
Illinois, University of	3
Iowa, The State University of	25
Kalamazoo School of Occupational Therapy Western Michigan College of Education	4
Kansas, University of	5
Medical Field Service School, U. S. Army	27
Michigan State Normal College	6
Mills College	7
Milwaukee-Downer College	8
Minnesota, University of	9
Mount Mary College	10
New Hampshire, University of	11
New York University	12
Ohio State University	13
Philadelphia School of Occupational Therapy, University of Pennsylvania	14
Puget Sound, College of	15
Richmond Professional Institute of the College of William and Mary	16
St. Catherine, College of	17
San Jose State College	18
Southern California, University of	19
Texas State College for Women	20
Washington University	22
Wayne University	26
Wisconsin, University of	23
Foreign School of Occupational Therapy	
Occupational Therapy Training Centre, Sydney, Australia	100

Mary Frances Heermans, O.T.R.
Educational Secretary

EDITORIAL

WHY NOT WITH THE MENTALLY RETARDED?

Over the years little has been published in the American Journal of Occupational Therapy in relation to occupational therapy for the mentally retarded individual.

As with so many other types of disabilities, the public is just now becoming aware of the large number of people so affected. Parents, friends and families of the retarded are searching for ways of helping and overcoming the handicaps that nature or circumstance has so unkindly bestowed upon these innocent human beings.

Occupational therapists through their training have at their fingertips the professional qualifications and tools to explore, to help evaluate, and to help develop the physical and mental potentials of the retarded individual.

In this country many slow learners and mildly retarded adults are making their way economically and socially with a minimum of help from family or community members. It is not these groups with which this editorial is concerned.

One of the very greatest services an occupational therapist may render when working with the retarded is to those individuals who in addition to retardation have other problems such as, cerebral palsy, severe medical problems, skeletal deformities, speech and hearing difficulties, or emotional problems. A large number of these people have a learning potential and are being severely penalized by inadequate understanding and too few facilities for their education and training and their useful employment.

Whether we wish to accept the facts or not, the members of our society are actually being faced with providing either additional institutions to care for these people with combined mental and physical handicaps or to provide a day program of care and education for them through community facilities.

In this writer's opinion the answer for society does not seem to lie in building more and larger institutions for all the retarded. More likely the answer might lie in providing day programs for the development of the young retarded child and suitable sheltered workshop facilities or sheltered outdoor work and play programs in the community, so that older individuals may be permitted to make their greatest contribution to society both socially and economically.

A great many of those who are considered less capable are aware of being "placed on the shelf," so to speak, but when given an opportunity they are willing and anxious to do their bit in the world. Would it not be economically and socially sound to reserve the building of costly institutions mostly for those unable to adjust to or be accepted in community living?

It is not this writer's intention to solve the problem nor to set up an ideal program but rather to stimulate the thinking of the future therapist as well as the thinking of the graduate O.T.

Some parents' groups, many of which are affiliated with the National Association for Retarded Children, are offering scholarships to qualified persons who will enter the field of mental retardation. Few occupational therapists have availed themselves of these opportunities. The field is an open one. It is challenging and offers many rewards. It remains but for the therapist with a career in mind to look through this challenge toward the future.

Eleanor C. Kille, O.T.R.
Southbury Training School
Southbury, Connecticut

TRAINING PROGRAM

A training program for personnel concerned with the care of cerebral palsied children will be conducted under the direction of Dr. Luigi Luzzatti at Children's Hospital, San Francisco, California, to begin on February 1, 1955.

For information and application forms, write to Miss Helen B. Holodnak, Executive Director, United Cerebral Palsy Association of San Francisco Pre-Nursery Program, Children's Hospital, 3700 California Street, San Francisco, California.

PEOPLE YOU SHOULD KNOW

DORIS F. WILKINS, O.T.R.

A Biographical Sketch
by
MARION W. CRAMPTON, O.T.R.

A quick review of the life of Doris Wilkins reveals that she has been able to combine her professional work with her love for travel and new experiences, which she considers so important as an educational background. Her positions have been with Army, Navy and state institutions as well as with universities. These positions have found her working in New Hampshire, Massachusetts, Texas, California, Washington, D. C., and Australia while practicing occupational therapy in the fields of psychiatry, penology, tuberculosis, general medicine and surgery, physical disabilities and education. Her friends know her as a person with abounding enthusiasm, widespread interests, a zest for living and a keen sense of humor.

Doris was born in Methuen, Massachusetts. She graduated from the Tilton Seminary, Tilton, New Hampshire, and attended the Boston School of Physical Education, now called the Bouve-Boston School. In 1922 she received a graduate certificate from the Boston School of Occupational Therapy. Her first position was at the New Hampshire State Hospital in Concord where she worked with men and women on the wards and in the shop.

In 1924-1925 a six months post-graduate course in occupational therapy at the Walter Reed General Hospital in Washington, D.C., found Doris doing setting-up exercises for one-half hour every morning, at 6:45 a.m., as a requirement of the course. She remained at this hospital as a member of the occupational therapy staff, working with tuberculosis patients, and for awhile, in the Weaving Curative Workshop with Mrs. Emmy Sommers, an authority in weaving. Here too, she was assistant editor, then acting editor, of the eight-page weekly hospital publication, *The Comeback.*

The years 1927-1928 were spent at Letterman General Hospital in San Francisco working on the neuropsychiatric ward. She had an opportunity to learn psychometric testing in order to give Stanford-Binet Psychometric Tests as needed on the psychiatric ward and to patients sent over from Alcatraz. In conjunction with this she observed at Alcatraz and at the State Penitentiary at San Quentin.

Other staff positions held from 1928-1935 were in Massachusetts at Chelsea Naval Hospital and Danvers State Hospital.

Her first position as director was at one of the institutions in the Massachusetts Department of Correction, Bridgewater State Farm in Bridgewater. Here she trained students from the Boston School of Occupational Therapy. It was in this occupational therapy program that she incorporated one of her experiences from the post-graduate course at Walter Reed General Hospital. All the female defective delinquent girls were required to participate in an outdoor early morning drill and exercise period which started at 6:45 a.m.

From 1940-1942 she was director of occupational therapy at the Metropolitan State Hospital in Waltham, Massachusetts. Students from the Boston School of Occupational Therapy spent six-month periods here in clinical training. At this time Doris collaborated with Elvin V. Semrad, M.D., one of the psychiatrists on the staff in writing a paper entitled, "Occupational Therapy as an Aid to Psychotherapy." This was published in the December, 1942, issue of *Occupational Therapy and Rehabilitation.*

Her next move was to the William Beaumont General Hospital in El Paso, Texas, where she remained from 1942-1944, with time out for a two weeks' refresher course in Army occupational therapy procedure in San Francisco. She was given charge of organizing the orthopedic occupational therapy shop, later being transferred to the psychiatric shop. Doris was awarded a badge of merit for excellence in civil service in the Army in war time.

Her first experience as head of an occupational therapy school came in 1944, when she became supervisor of the occupational therapy curriculum at the University of New Hampshire in Durham.

(*Continued on page* 277)

FEATURED O. T. DEPARTMENTS

DEPARTMENT OF LABOR AND INDUSTRIES REHABILITATION CENTER

Seattle, Washington

Patsy J. Brittain, O.T.R.

"The Washington State Department of Labor and Industries, in 1948, established the Rehabilitation Center in Seattle, Washington, as a part of the Workmen's Compensation program of 'sure and certain' assistance for injured workmen. The Center is operated as a service to the injured workman and his physician. Patients are admitted only upon referral by the attending physicians. The Center provides a six hour daily program of physical therapy, occupational therapy, industrial fitness reconditioning and vocational placement under medical supervision. Thus an active, purposeful convalescent period, motivated by plans for future employment, helps the patient get well faster in place of the all too common 'arm chair' convalescence of slow progress, boredom and discouragement.

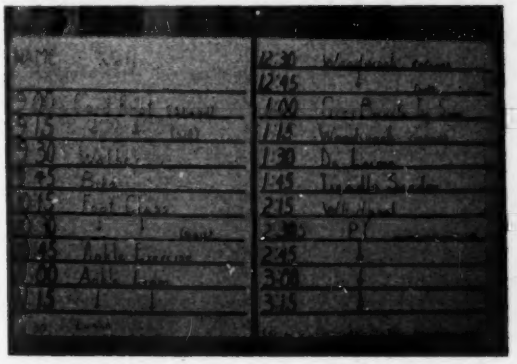
"The Center was established through the cooperative effort of the medical profession, labor and management organizations and the department of labor and industries. Medical policies of the Center are established by a medical advisory board of 20 outstanding Washington physicians. The medical director serves without compensation . . . The Center is financed jointly by employees and employers out of Medical Aid Funds. No tax monies being used."[1]

PHYSICAL OPERATIONS

All physical facilities of the Center are located in downtown Seattle. The occupational and physical therapy departments occupy the entire second floor of a two story building. The industrial fitness reconditioning is in a separate building. The average patient load is 60 with a maximum of 75 during peak periods. This is an increase, due to enlargement of present facilities, from a former peak load of 50 patients. The therapy staff consists of: a supervisory therapist (a physical therapist), eight physical therapists, five occupational therapists and one industrial fitness therapist. Other members of the staff in direct contact with patients are: the supervisor of rehabilitation and replacement, patient counselor and replacement contact representative, who is the liaison with the state division of vocational rehabilitation. An administrative assistant supervises all clerical employees.

Three out of four patients entering the Center for treatment come from outside the Seattle area. These are boarded in established facilities locally.

The Center is not intended to be pre-vocational in any way. That training is provided, when indicated, through the division of vocational rehabilitation "to assure the injured workman regular work for wages."[1] Nor does the Center establish any disability awards or pensions. The average length of treatment is approximately six weeks and may vary from one week to one year, six hours daily. This concentrated program consists of regular physical therapy treatment plus various remedial gym activities and kinetic occupational therapy plus industrial fitness reconditioning. The treatment time between the departments is dependent on condition of disability. As the patient's condition improves his/her program increases from a light to a heavy kinetic program. The physical and occupational therapy departments meet once a week to pool important information regarding the patient's condition and make adjustments in treatment program; thereby coordinating a well integrated program for maximum benefit of the patient.

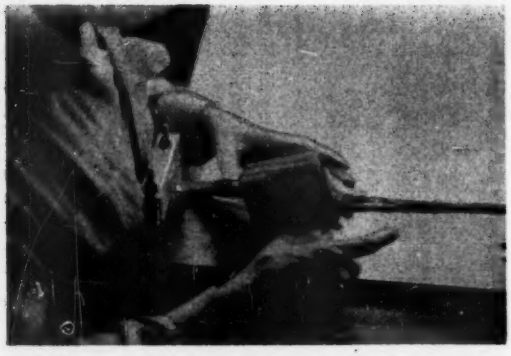


Typical schedule card for a compound fracture of tibia-fibula, L leg, upper third, with dislocation of L knee and atrophy of lower L leg.

New patients are evaluated at the beginning of the week. The senior staff consisting of the medical director, supervisor of rehabilitation and replacement, patient counselor, supervisory therapist, senior occupational therapist and replacement contact representative meet to present the results of individual interviews, discuss recommendations by the medical director to the referring physicians and feasibility of treatment. New patients are orientated by the Center movie and the senior staff before their treatment program begins.

OCCUPATIONAL THERAPY DEPARTMENT

The occupational therapy department is divided into four sections to facilitate treatment media and because of physical layout. This permits the therapist a closer opportunity for supervision of treatment media in specific disabilities. A section will not only contain such kinetic equipment as bicycle jig saws and treadles for back or lower extremity injury, but also woodwork and reed for



Card-weaving used in Colles fracture, L arm, shortening of radius, fracture of ulna styloid Sudeck's disease.

upper extremity disabilities. Each section will have 50 to 60 patients on a working roster, spaced throughout the six hours. So that each therapist is aware of various independent problems with upper and lower extremities or back injuries, a minimum of four months is spent in each section; at the end of that time they are rotated. One section is purposely kept small in treatment media so that the therapist in charge acts as the assistant to the senior occupational therapist. This allows all the therapists an opportunity to work with administrative procedures.

Kinetic equipment with necessary adaptations are used to gain maximum function of the injured part. The usual occupational therapy media is utilized with the addition of assistive slings, weights and various sized handles. Next to obtaining as near normal function of the impaired part as possible is the grading of standing and work tolerance. Unless a man can perform a normal working day, his job potential is reduced and his family suffers economically.

The patients referred to the Center fall into three categories: the man from the woods—bucker, faller or sawyer; the man from general labor—construction worker, warehouseman and helper; the man who is a specialist—journeyman, electrician, millwright. The average age level falls between 40 and 50. Schooling is limited. The occupational therapist, in addition to her academic background and use of crafts in treatment media, must also be aware that most of these men have never had the time or opportunity to work with any such media. She must explain in understanding terms why weaving with a shoulder adaptation bar will aid in improving function of a shoulder or back; and making a reed tray will further function in fingers that were almost severed in a conveyor belt or partially amputated. There are also psychological problems which may improve with the "group therapy" of mixing with others whose disability they observe is far worse than their own. The most common problem being "compensatitis." Typical injuries include: fractures of all types and in all extremities, burns, bone grafts, amputations, back strains-sprains, and nerve involvement. Only rarely will there be traumatic neurological disabilities, e.g. the hemiplegic.

THE AMPUTEE

Another service provided by the Center is for the amputee. All are referred to the amputee commission for evaluation; prescription, when indicated, for a prosthesis and treatment; and disability award after treatment and training are completed. The commission is composed of an orthopedist, a general surgeon, and a psychiatrist. The prosthetic training of all lower extremities is conducted by the physical therapy department and all upper extremity prosthetic training is done by the occupational therapy department, with adjunctive treatment conducted jointly.

ALLIED FIELD ORIENTATION

Due to the variety of disabilities the occupational therapy department is used as a clinical training center for occupational therapy students. The Center also serves to familiarize medical students, under-graduate and graduate nurses in the local area with rehabilitation procedures and policies. An excellent movie on the treatment at the Center is used during these and other orientations.

SUMMARY

The Industrial Insurance Law and Workmen's Compensation Act of the state of Washington is a life time study—suffice it to say that this law from the standpoint of medical care is one of the foremost in the nation.[2] There are only two centers in the entire United States operated under state workmen's compensation laws. "The primary objective of the Center is to help the injured workman to get well faster and restore him to as useful a life as possible . . . Four of five patients return to gainful employment within a reasonable length of time. Eighty per cent of the Center's patients have expressed themselves to the general effect that Center treatment materially shortened their convalescent period and saved them considerable loss of wages . . . Thus the man and his family, the employer and the State all benefit from the program of the Rehabilitation Center."[1]

REFERENCES

1. *Biennial Report* 1952-1953. Kennedy, Elmer H.; Supervisor, Rehabilitation and Replacement, Department of Labor and Industries, Rehabilitation Center, Seattle, Washington.
2. *Industrial Insurance Law and Workmen's Compensation Act.* MS, McLean, R. J.; Supervisor of Claims, Department of Labor and Industries, Olympia, Washington.

Appreciation is extended to Mr. Kennedy, my supervisor, and the other members of the staff who so graciously gave of their suggestions and criticisms during the preparation of this article.

DELEGATES DIVISION

ARKANSAS

Delegate-Reporter, Virginia Stockwell, O.T.R.

The Arkansas Occupational Therapy Association continues to be an interested, if small, group. Because of its size it is able to have informal meetings in the homes of members as well as luncheons, picnics and dinners.

At the meeting prior to the AOTA conference, Dr. H. N. Peters of North Little Rock VA Hospital was the guest speaker. Dr. Peters was a participant in the 1953 institute program on research. A round table discussion of research, problems, suggestions and ideas was a satisfactory feature of the meeting.

In November, 1953, a luncheon meeting was held and reports were brought from the Houston conference. After the meeting the showing of a movie on occupational therapy was shown. This was viewed by the group to determine its suitability for use by the local TV station. The station plans to use the film at a future date.

In February, a dinner meeting followed the sixth annual neuropsychiatric meeting at the North Little Rock VA Hospital. All occupational therapists in this area were invited to attend this meeting, as were others who might be interested. Mrs. Fanny Vandikooi was the guest speaker. Her subject was "Problems of Student Selection and Training." Plans are being made to hold a meeting again this year following the neuropsychiatric meeting and possibly have one of the participants as our speaker.

The annual meeting of AOTA was a picnic supper held in Hot Springs in May, 1954. At this meeting officers were elected for the ensuing year and final business for the year transacted.

OFFICERS

President	Capt. Barbara Roper, O.T.R.
Vice-President	Mrs. Betty Sorensen, O.T.R.
Secretary-Treasurer	Mrs. Margaret King, O.T.R.
Delegate	Virginia R. Stockwell, O.T.R.
Alternate Delegate	Florence Wood, O.T.R.

KENTUCKY

Delegate-Reporter, Carol Hyatt, O.T.R

During the year 1953-54 the Kentucky Occupational Therapy Association met eight times with an average attendance of ten from an active membership of twenty registered therapists within the state. Eight active associate members also took part in various meetings and activities.

Meetings at which a formal program was presented included: joint meeting with Indiana; panel with physical therapist, speech therapist and physiatrist on integration of efforts in total push toward self care; talk by child psychiatrist on best treatment for sick children.

Other meetings were a concentrated attack on current business which included modifying the constitution, recruitment of prospective students, discussing the possibility of having an AOTA conference in this state and considering support for the Kentucky Physical Therapy Association in its fight against unlicensed, non-registered persons practicing as physical therapists.

Constitutional changes aimed toward increasing the efficiency of our small group centered on: lengthening the term of office to two years to take advantage of experience gained in first year of office; increasing number of regular meetings to nine each year to bring more continuity to special projects such as recruitment; increasing treasury income by raising dues of active members also active in profession and KOTA while keeping as they were dues for active members now retired to family life (five members fall in latter class).

Our "project for the year" has been a recruitment program entered in conjunction with the Kentucky Physical Therapy Association and originally under guidance from a public relations and contact expert from the University of Kentucky. Committees of occupational and physical therapists were set up to study and act in such areas as: possibility of courses in ancillary therapies being given at schools within the state; scholarships available to students; need and plans for future institute in the state or area; ways of contacting students who show interest and aptitude for OT and PT. Various teams contacted many high school students in metropolitan Louisville and Lexington as well as college students at Berea and Transylvania. This recruitment program will carry over into the coming year, for we feel we have scarcely scratched the surface of general awareness that there are such professions. Still needed are dozens of students from Kentucky likely to return to this area to fill the constant, ever-increasing demand for them.

OFFICERS

President	Mrs. Frances Jonakin
Vice-President	Mrs. Patricia Swartz
Secretary	Mrs. Elizabeth Yokum
Treasurer	Miss Toyne Harris
Delegate	Mrs. Carol Hyatt
Alternate	Mrs. Kerby Burkhardt

INDIANA

Delegate-Reporter, Helen L. Hopkins, O.T.R.

During the past year one of the aims of the Indiana Occupational Therapy Association has been to present to the members a varied program including all phases of occupational therapy. In accomplishing this aim our meetings included one of special interest to psychiatric occupational therapists in which a music therapist from one of the newest state hospitals told us of the scope and problems in her field. Those therapists in the physical disabilities area were especially interested in the annual joint P.T.-O.T. meeting where an outstanding neurologist, Dr. Alexander Ross, gave us a very good review of many neurological conditions. Of necessity, our annual May meeting was devoted entirely to business. Our fall meeting was one which was devoted to becoming better acquainted with our neighboring Kentucky O.T. Association.

Our second aim for the year has been that of recruitment. Along with normal activities toward recruitment, members of our association built a portable screen covered with burlap and chicken wire on which O.T. exhibits can be attractively displayed. This is available for any O.T. department in the state to use. It's first use was for that of the First Annual Health Fair held at the Indiana State Fairgrounds in Indianapolis. Our exhibit created much interest and comment.

The high point of our year was the pleasant task of acting as host to the Board of Management at their midwinter meeting. This gave us all an opportunity to meet our national officers and Board members and to sit in on the open meetings of the session and thus become better acquainted with the running of our national organization.

During this year we have also been fortunate in receiving a scholarship for an Indiana occupational therapy student given by the Epsilon Pi Chapter of the Delta Theta Tau Sorority.

Our association has an active membership of 33 therapists and two associate members.

OFFICERS

President	Evelyn Marsh, O.T.R.
Vice-President	Beryl Manly, O.T.R.
Secretary	Marjorie Hillsman, O.T.R.
Treasurer	Joyce Campbell, O.T.R.
Delegate	Helen L. Hopkins, O.T.R.
Alternate Delegate	Joan Silhavy, O.T.R.

SOUTHERN CALIFORNIA

Delegate-Reporter, Alice Cooley, O.T.R.

The Southern California Occupational Therapy Association has ninety-five active members, three associate members, six student members and one honorary member. During the year 1953-54 nine interesting meetings were held.

The first meeting was held at the Los Angeles County Hospital. A psychiatrist from the new psychiatric unit discussed the functions of this unit in the treatment of acute mental diseases and related legal aspects.

An especially outstanding meeting, a panel discussion on cerebral palsy, was held at Children's Hospital in Hollywood. Panel members were three occupational therapists from three different treatment centers. This discussion and exchange of ideas on treatment techniques proved most worthwhile.

In December highlights of the Houston conference were presented. "Listening Ears," a film illustrating the work of the John Tracy School for Deaf Children, was shown.

Each year a meeting is held with the local Physical Therapy Association. Responsibility for planning this meeting alternates between the two groups. Both groups enjoy this annual opportunity to get together.

"Music in Therapy" was the topic for discussion at the meeting held at the University of Southern California. At the April meeting Dr. R. V. Freeman, Chief, Physical Medicine and Rehabilitation at the V. A. Neuropsychiatric Hospital, West Los Angeles, was guest speaker. His topic was "Motivation" in the broadest sense of the word and its specific meaning in treatment.

Our annual money-raising venture proved to be very successful again. The bazaar which is held at the Crippled Children's Society in Los Angeles brought in approximately $850.

The last meeting was a banquet-meeting at which annual awards were made to practicing occupational therapists for outstanding professional work. At this time the newly elected officers were presented.

Recruitment continues to occupy much of our time and thought. During the past year speakers' teams contacted fifteen groups of interested high school students. The three-member teams were composed of an occupational therapist, physical therapist and dietician. Presentation of information was done in the form of a skit depicting the care and treatment of a polio patient from the acute stage of the disease through the convalescent. One hundred envelopes containing literature on occupational therapy were sent to high schools and junior colleges. Individual members have given much time to conferences with interested persons and have made numerous speeches to interested groups.

The Association participated in the Western Hospital Association convention with an exhibit and a panel discussion on "The Use of Occupational Therapy in the Small Hospital." Many members were able to attend sessions of the American Physical Therapy Association's convention which was held in Los Angeles this spring.

The S.C.O.T.A. NEWSLETTER was published three times this year and was an effective means of keeping our far-flung membership informed of current events, both professional and social.

The placement chairman has been very active. The influx of occupational therapists to Southern California has made it difficult to place all applicants. At present there are many more applicants than available positions.

We anticipate a busy, interesting year working on plans for the 1955 conference in San Francisco, and are looking forward to being your hostesses at what we are certain will be an outstanding event.

OFFICERS

President	Harriet Zlatohlavek, O.T.R.
Vice-President	Naomi McKinney, O.T.R.
Corresponding Secretary	Martha Crissman, O.T.R.
Recording Secretary	Julie Werner, O.T.R.
Treasurer	Carl Gustafson, O.T.R.
Delegate	Alice Cooley, O.T.R.
Alternate Delegate	Ada Marie Bowers, O.T.R.

NEBRASKA

Delegate-Reporter, Sophia R. Lindahl, O.T.R.

"The Team Approach Theory" has gradually become the actions of the professional groups in Nebraska. The Nebraska Hospital Association invited the N.O.T.A. and the other allied hospital associations to meet simultaneously, but independently of each other, at the first annual two day workshop. Since the interest and attendance far surpassed the hopes of the committee, plans are to have the workshop an annual affair. Physicians from five specialties, who work with occupational therapists, spoke on "What the Physician Expects When He Sends the Therapist a Referral." Each talk was followed by a discussion period moderated by his therapist. Therapists and aides from Nebraska and South Dakota were present.

The N.O.T.A. shared a booth with the Nebraska Physical Therapy Association during the Centennial Year Career Week at the University of Omaha. Recruitment materials were distributed to the high school seniors from Eastern Nebraska.

After much controversy, publicity and hard work, the State Board of Control has adjusted the salary scale of the occupational therapists to compare favorably with those of the surrounding states. Provisions have been made for five classifications: two for registered therapists, one for trained aides, one for untrained aides and one for students in clinical practice. Many unfilled position in our state still exist.

OFFICERS

President	Thelma Bullard, O.T.R.
Vice-President	Mrs. Patricia Northrup, O.T.R.
Secretary	Marilyn Green, O.T.R.
Treasurer	Sister Ruth Nelson, O.T.R.
Delegate	Sohpia R. Lindahl, O.T.R.
Alternate Delegate	Stella Durning, O.T.R.

PUERTO RICO

Delegate-Reporter, Maria Isabel Ponton

The September meeting of 1953 of the Peurto Rico Occupational Therapy Association was honored with the presence of Miss Marjorie Fish, executive director of AOTA, who visited the island as consultant to the State Insurance Fund concerning the newly established school of physical and occupational therapy. We all had the opportunity to talk with Miss Fish and seek advice for some of our problems. All the members were delighted with her visit.

Recruitment and publicity has been the focus of considerable effort during the year. The chairman of the committee has been using movies and slides of different activities in occupational therapy. These have been used extensively in presenting our profession as a career to various high schools and university groups. We feel the need of extending our publicity to hospitals, especially in San Juan and near by towns, and plans are being made to this respect.

Another activity which has been successful this year was the annual sale of home made articles donated by the members of the Association. Through this endeavor we plan to finance yearly a scholarship fund for a student of occupational therapy. A committee has been nominated

with the purpose of studying the applications and granting the scholarship.

Because of the effort and interest of Dr. Herman Flax, chief of physical medicine and rehabilitation of the Veterans Administration in Puerto Rico, two of our private hospitals are now staffed with registered occupational therapists: Clinica Fernandez Garcia under Mrs. Olga Orraca and Clinica Julia under Mr. Esteban Lopez.

It was good news to hear that the American Medical Association has accredited the School of Physical and Occupational Therapy started by the State Insurance Fund about two and a half years ago. Our congratulations to Mr. Atiles, Administrator of the State Insurance Fund, to Dr. H. Storms and Miss Carmen P. Perez, O.T.R.

OFFICERS

President.....Miss Rosa Elisa Jorge, O.T.R.
Vice-President.....Miss Maria Elena Guerrero, O.T.R.
Secretary.....Miss Sylvia Rodriguez, O.T.R.
Treasurer.....Miss Carmen Pura Perez, O.T.R.
Delegate.....Miss Maria Isabel Ponton, O.T.R.

Aphasia Patients . . .

(*Continued from page 237*)

individual to attain a higher level of learning than was present before the injury. The recovery of abilities is usually in the following order: comprehension of spoken language, speech (repetitive at first), reading, telegraphic speech, formulation of sentences, and writing.

The aphasic individual is easily distracted, thus more constructive work can be done in a room set apart for instructional purposes. The room should be situated in a section where a maximum of concentration can be obtained without interruption of any kind. The furnishings should include a blackboard, mirrors, bookcases or file cabinets for storage of teaching materials, a comfortable chair for the aphasic individual together with a writing board or clip board for his use. It is important that the aphasic be relaxed and at ease at all times during his training.

The therapist should always speak slowly and distinctly to the aphasic and be alert for signs of fatigue and frustration. The aphasic's attention span may encompass only a few minutes at first, then a rest period should be permitted before going on with the training process. The therapist can adjust the length of the training periods as the aphasic's response indicates. In work with individuals five to thirty minutes per period is usually adequate, whereas in group work a thirty to sixty minute period can be utilized.

"There is no clearly defined borderline between one type of aphasia and another."[11] It is therefore difficult to outline a specific training program to fit the needs of the individual aphasic, thus suggested means of treatment will be described for each entity. Teaching methods must be varied and the therapist must utilize ingenuity and inventiveness to stimulate the aphasic individual's recognition and comprehension.

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Total Rehabilitation . . .

(*Continued from page 240*)

ing and work management principles developed in industry are also applicable to disabled housewives in order to teach them simplification of their household tasks. This idea has already been put into practice in some institutions.

Better understanding of the medical value of occupational therapy requires its incorporation into the curriculum of medical schools. As regards the schools of occupational therapy, it is true that they recognize the concept that the physical, vocational and psychological needs of the patient must be dealt with as a unity. However practice falls short of the precept. Documentation of this statement may be derived from a study of curricula offered in schools of occupational therapy. In one school in 1941 training was exclusively in the arts and crafts; in 1954 about ten per cent of the total time was devoted to modern industrial techniques. Other schools offer the same or even less training in present day occupational pursuits. To keep pace with the trend in rehabilitation it is their prime responsibility to change the content of the curriculum by introducing vocationally meaningful modalities, although such a revision will probably be accompanied by increased costs. This price is small compared with the gains accruing to the community in better service to the handicapped. It will also mean revitalizing occupational therapy and strengthening it against claims made by workers with less clinical knowledge but more appropriate techniques than the therapist possesses.

If occupational therapy cannot rise from its atavistic state, then it will have to recognize those therapies which, although not accredited, can make a real contribution to rehabilitation. It would be better however to have a few first-class therapists than a welter of rehabilitation specialists. A so-

lution does not consist of pressing several related disciplines into the service of occupational therapy, as has already been attempted. Such a device makes for a heterogeneous group containing people with varied backgrounds of experience and professional outlooks and militates against cohesion. Rather new techniques will have to be assimilated and taught in the schools; techniques which are concerned with machine-operated tools, assembly processes and other basic operations which will be meaningful to a patient and useful to him upon arriving at the next phase of his rehabilitation, namely, vocational training.

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Home Visit . . .

(*Continued from page* 262)

the mouth, for instance, the effort might be exhausting and seem out of proportion to the satisfactions involved. A problem arises when such services continue to be given when they are no longer needed.

The observation of children being handled on an infantile level in many homes indicated a need for special work with the parents on both a group and on an individual basis. The staff came to the conclusion that success in working with the children depended in large part on a simultaneous plan for interpretation of the treatment plan to the parents. Part of this need was met by the individual follow-up discussion with the social worker. In addition, for children newly entering the school, an intensive orientation course for the parent was planned.

However it was recognized that there were a few families where the pattern of hostility to the child, or of over protection, were part of a deeper problem and needed handling on a deeper and more highly individualized level. In such instances it was questionable whether the school could be successful in training the child while the traumatic emotional situation continued to exist at home; and in these cases the immediate goal was to help the parents find help for their own personal problems.

Sally, aged nine, was unable to sleep unless she shared her father's bed. Mrs. K. asked us to discuss this with her husband since they had quarrelled so bitterly that they no longer were on speaking terms. Sally spent much of her time alone in her room. During weekends she never wore the braces with which she was learning to walk at school. It seemed clear that the parents' unhappy relations with each other had a close bearing on the poor progress that Sally was making in school. However, the mother did not recognize her own need for counselling, and Mr. K. was not willing to come to school to discuss Sally's progress.

SUMMARY AND CONCLUSION

It has become increasingly evident that we cannot diassociate the handling of a cerebral palsied child in a training center from his life in the home and the community. Treatment, training and even education must be related specifically to the home needs, and conversely the home must be oriented to the special needs of the child. To bridge the gap between home and school the practice of home visiting by a social case worker was included in the program of a cerebral palsy school treatment unit.

Several case situations are described. We found the benefits of our home visiting program to be: (1) The staff felt that it had a greatly improved understanding of the child in his family setting. (2) Individual programs could be modified to provide for the child's special needs at home. (3) Where the parent's understanding of the objectives of treatment was seen to be inadequate, increased opportunities to visit the school were provided and regular conferences with individual staff members arranged. (4) A program to orient parents whose children were being started in the school was initiated. (5) It was felt that there was a relaxation of tension in many homes resulting from a better appreciation of the school's goals and methods. (6) Improvement in the program of individual children was noted.

It is recommended that a home visit for the purpose of integrating the child's program at home and in treatment should be adopted as a regular part of a cerebral palsy treatment program.

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Laterality . . .

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Carson Cart . . .

(*Continued from page* 265)

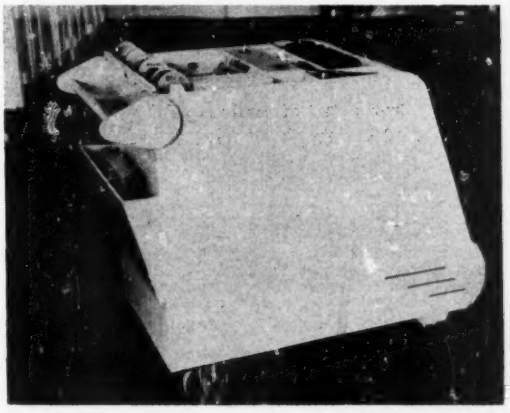

Figure 4

In view of the differences in numbers and types of patients being treated, construction of various parts of the cart will necessarily vary somewhat. However, with these basic plans, it is hoped that other therapists will adopt the use of the Carson Cart and find it as satisfactory as we have. We would of course appreciate criticism and comments since we are interested in any adaptations and improvements that might be suggested.

People . . .

(*Continued from page* 270)

The Occupational Therapy School of Victoria in Melbourne, Australia, needed a director in 1950. Doris accepted this position, remaining there until December, 1953. The school, founded in 1948, offers a three-year diploma course. It is affiliated with the University of Melbourne and the Melbourne Technical College. Its standards meet the requirements of the World Federation of Occupational Therapists.

On her return to this country in February, 1954, she took a temporary position as occupational therapy coordinator for the pilot study in rehabilitation at Boston State Hospital in Boston, Massachusetts. This research project, started in June, 1952, is sponsored by the National Institute of Mental Health for the purpose of determining more specifically what the medical ancillary services are contributing to the rehabilitation of mental patients.

August, 1954, found Doris back in New Hampshire as director of the New Hampshire Rehabilitation Center. Sponsored by a private organization called the Crotched Mountain Foundation, this is one of the Foundation's three centers offering facilities to the physically handicapped children and adults.

Doris has crossed the U.S.A. three times—by train, boat, and automobile. She has always taken advantage of the location of her positions to take side trips, having visited eastern and western Canada, Alaska, Mexico and the Panama Canal. She circled the globe in going to and returning from Australia. She has visited the Sydney Occupational Therapy School in Australia and the Bombay Occupational Therapy School in India. In Bombay she was the guest of Mrs. Kamala Nimbkar, O.T.R., director of the school. Doris met students and toured clinical training centers as well as the city and suburbs.

Two days in Tahiti, one week's vacation sightseeing on the island of Tasmania, a visit to the Aboriginal Mission in the state of Victoria, a flight from Colombo to Bombay via Madras, a boat stop at Port Said which was under martial law, and a tour of Italy, Switzerland and France constitute some of the highlights of her Australian trip. Now she has returned to the quiet life of Durham, New Hampshire, where she bought a house in the late 1940's while working at the University. She lives here and drives daily to her position in Manchester. Her mother, who accompanied her to Australia, lives with her. Here Doris can look out of any window in her house and see water, the symbol of motion and travel which has been so much a part of her life.

SCHOOLS OFFERING COURSES IN OCCUPATIONAL THERAPY

Approved by the Council on Medical Education and Hospitals of the American Medical Association

Name of School	Name and Address of Director	Tuition	Type of Course	Entrance Requirements	Classes Start	Length of Course	Students M	Students F	Enrollment
Boston School of Occupational Therapy Affiliated with Tufts College	Mrs. John A. Greene, President Boston School of Occupational Therapy, 7 Harcourt Street Boston 16, Massachusetts	a. $650/acad. year $200 clinical affiliations	a. Post Degree Course (Diploma)	*a. College degree or accredited professional training	a. Sept.	a. 1 acad. yr. plus 10 mos. clinical affiliations.	Yes	Yes	130
		b. $650/acad. year $200 clinical affiliations	b. Degree (B.S. in Education) from Tufts plus B.S.O.T. diploma	b. As for the college; qualified transfer student (Soph. and Jr. years)	b. Sept.	b. 4 acad yrs. plus 10 mos. clinical affiliations			
Colorado Agricultural and Mechanical College School of Home Economics	Asst. Prof. Marjorie Ball, O.T.R. Director of Occupational Therapy, School of Home Economics, Colorado Agricultural and Mechanical College, Ft. Collins, Colo.	a. $182/acad. year ($407 for out-of-state residents) $55 clinical affiliations	a. Degree (B.S. plus certificate)	a. As for college; qualified transfer student	a. Sept.	a. 4 acad. yrs. plus 10 mos. clinical affiliations	Yes	Yes	120
		b. As above	b. Adv. standing certificate	b. College degree	b. Any quarter	b. 1 acad. yr. plus 10 mos. clinical affiliations			
Columbia University College of Physicians and Surgeons	Asst. Prof. Marie Louise Franciscus, O.T.R. Director of Training for Occupational Therapy Columbia University, College of Physicians & Surgeons, 630 West 168th Street New York 32, New York	a. $750/acad. year $10 clinical affiliations	a. Degree (B.S.) from Faculty of Medicine	*a. 2 yrs. college	a. Sept.	a. 2 acad. yrs. plus 9 mos. clinical affiliations	Yes	Yes	80
		b. As above	b. Advanced Standing (Certificate)	*b. College degree or accredited professional training	b. Sept.	b. 1 acad. yr. plus 9 mos. clinical affiliations			
Illinois, University of College of Medicine	Assoc. Prof. Beatrice D. Wade, O.T.R. Head, Department of O.T. University of Illinois 1853 West Polk Street Chicago 12, Illinois	In Urbana (acad. yr.); $136 for Illinois residents $356 for out-of-State residents In Chicago (16 months); $222 for Illinois residents $514 for out-of-state residents.	Degree (B.S. in O.T.) from College of Medicine	As for the College of Liberal Arts	Oct. Feb.	3 acad. yrs. Liberal Arts College, 16 mos. College of Medicine and clinical affiliations	Yes	Yes	90
Iowa, State University of College of Liberal Arts and College of Medicine	Asst. Prof. Elizabeth Collins, O.T.R. Occupational Therapy Supervisor, Division of Physical Medicine, College of Medicine, State University of Iowa, Iowa City, Iowa.	a. $156/acad. year $366 for out-of-state residents	a. Degree (B.A.) from College of Liberal Arts, plus Certificate from College of Medicine	*a. As for University	a. Sept. Feb.	a. 4 acad. yrs. plus 10 mos. clinical affiliations	Yes	Yes	74
		b. $156/acad. year $256 for out-of-state residents	b. Advanced standing (Certificate)	b. As above	b. Sept. Feb.	b. 1 acad. yr. plus 10 mos. clinical affiliations			

Name of School	Name and Address of Director	Tuition	Type of Course	Entrance Requirements	Classes Start	Length of Course	Students M	Students F	Enrollment
Kalamazoo, School of Occupational Therapy of Western Michigan College of Education	Assoc. Prof. Marion R. Spear O.T.R., Director of Occupational Therapy Kalamazoo School of Occupational Therapy of Western Michigan College of Education Kalamazoo 45, Michigan	a. $140/acad. year $215 for out-of-state residents b. As above c. As above.	a. Degree (B.S. with major in O.T.) plus diploma b. Advanced Standing (Diploma) c. Graduate (M.A.)	a. As for the college; qualified transfer student b. Degree c. O.T.R. with college degree	a. Sept. Feb. b. Sept. Feb. c. Sept. Feb.	a. Approximately 3½ acad. yrs. plus 9 mos. clinical affiliations b. 2-3 semesters plus 9 mos. clinical affiliations c. 30 semester hours	Yes	Yes	181
Kansas, University of	Assoc. Prof. Frieda Drohobitch, O.T.R., Director of Occupational Therapy, University of Kansas Lawrence, Kansas	$150/acad. year $290 for out-of-state students $11.25 per clinical affiliation $27 for out-of-state students	Degree (B.S. in O.T.)	As for the University; qualified transfer student	Sept. Feb.	4 acad. yrs. plus 12 mos. clinical affiliations	No	Yes	110
Michigan State Normal College	Asst. Prof. Frances Herrick, O.T.R. Director of Occupational Therapy Michigan State Normal College Ypsilanti, Michigan	$140/acad. year $215 for out-of-state students	Degree (B.S. with major in O T.)	*As for college	Sept. Feb. June	4 acad. yrs. plus 9 mos. clinical affiliations	Yes	Yes	112
Mills College	Mrs. Ivabelle B. Rhodes, O.T.R., Director of Occupational Therapy Mills College Oakland 13, California	a. $800/acad. year $120 clinical affiliations b. $350/acad. year $120 clinical affiliations	a. Degree (B.A. with major in O.T.) plus Certificate b. Certificate	a. As for the college; qualified transfer student b. Degree from accredited college	a. Sept. Feb. b. Sept. Feb.	a. 4 acad. yrs. plus 10 mos. clinic affiliations b. 1½ acad. yrs. plus 10 mos. clinical affiliations	No Yes	Yes Yes	20
Milwaukee-Downer College	Prof. Henrietta McNary, O.T.R. Director, Department of Occupational Therapy Milwaukee-Downer College 2512 East Hartford Ave. Milwaukee 11, Wisconsin	a. $400/acad. year $50 clinical affiliations b. As above	a. Degree (B.S. with major in O.T.) b. Diploma	*a. As for the college; qualified transfer student *b. As above plus 1 yr. college or professional training; qualified transfer student	a. Sept. b. Sept.	a. 4 acad. years plus 10 mos. clinical affiliations b. 2 acad. yrs. plus 10 mos. clinical affiliations	No.	Yes	130
Minnesota University of School of Medicine	Miss Borghild Hansen, O.T.R. Director of Occupational Therapy University of Minnesota Minneapolis, Minnesota	$201/acad. year $417 for out-of-state students $222 clinical affiliations $336 for out-of-state students	Degree (B.S. in O.T.)	2 years Arts College; qualified transfer student	Sept.	3½ acad. yrs. plus 10 mos. clinical affiliations	Yes	Yes	39
Mount Mary College	Sister Mary Arthur, O.T.R. Director of Occupational Therapy Mount Mary College Milwaukee 10, Wisconsin	$250/acad. year	Degree (B.S.) plus Certificate	As for the college; qualified transfer student	Sept.	4 acad. yrs. plus 9 mos. clinical affiliations	No	Yes	76
New Hampshire, University of College of Liberal Arts	Miss Ruth McDonald, O.T.R. Supervisor of Occupational Therapy Curriculum University of New Hampshire Durham, New Hampshire	$250/acad. yr. $500 for out-of-state students $60 clinical affiliations $135 for out-of-state students	Degree (B.S. with major in O.T.) plus Certificate	*As for the university	Sept.	4 acad. yrs. plus 10 mos. clinical affiliations	Yes	Yes	85

Name of School	Name and Address of Director	Tuition	Type of Course	Entrance Requirements	Classes Start	Length of Course	Students M	Students F	Enrollment
New York University School of Education	Assoc. Prof. Frieda J. Behlen, O.T.R. Director of Occupational Therapy Curriculum New York University Washington Square New York 3, New York	a. $640/acad. year $160 clinical affiliations	a. Degree (B.S.) plus Certificate	*a. As for the University; qualified transfer student	a. Sept., Feb., June	a. 4 acad. yrs. plus 10 mos. clinical affiliations.	Yes	Yes	125
		b. As above	b. Certificate	b. Undergraduate degree	b. As above	b. 1½ acad. yrs. plus 10 mos. clinical affiliations			
		c. As above	c. Graduate (M.A.)	c. O.T.R. or eligible for O.T.R. with college degree	c. As above	c. 1 acad. yr.			
Ohio State University College of Education	Miss Barbara Locher, OTR Chairman, Occupational Therapy Department, The Ohio State University, Columbus 10, Ohio	$45/quarter $130 for out-of-state students $30 clinical affiliations	Degree (B.S. in O.T.)	*a. As for the University; qualified transfer student	Sept. Jan. March	10 quarters plus 10 months clinical affiliations	Yes	Yes	67
Pennsylvania, University of School of Auxiliary Medical Services	Prof. Helen S. Willard, OTR, Director, Philadelphia School of Occupational Therapy, 419 South 19th Street, Philadelphia 46, Pennsylvania.	a. $700/acad. year $100 clinical affiliations	a. Degree (B.S. in O.T.) plus Certificate of proficiency	*As for the University; qualified transfer student	a. Sept.	a. 4 acad. yrs. plus 10 mos. clinical affiliations	Yes	Yes	93
		b. As above	b. Certificate (Certificate of proficiency)	*b. College degree	b. Sept.	b. 1 acad. yr. plus 10 mos. clinical affiliations			
Physical and Occupational Therapy, School of Affiliated with the University of Puerto Rico	Miss Carmen P. Perez, O.T.R., Senior Supervisor of Occupational Therapy, School of Physical and Occupational Therapy, Professional Building, 8th floor, Santurce, Puerto Rico	Puerto Rican students under government scholarship Non-residents special arrangements	Diploma in O.T. and P.T.	Minimum of 2 yrs. college with B or 2.5 index	Sept.	34 months	Yes	Yes	40
Puget Sound, College of	Asst. Prof. Shirley Bowing, O.T.R. Director of Curriculum in Occupational Therapy College of Puget Sound Tacoma 6, Washington	a. $400/acad. $100 clinical affiliations	a. Degree (B.S. in O.T.) plus certificate	a. As for the college; qualified transfer student	a. Sept., Jan.	a. 48 mos.	Yes	Yes	76
		b. As above	b. Certificate	b. 1 year college (30 semester credits)	b. Sept., Jan.	b. 2 acad. yrs. plus 12 mos. clinical affiliations			
		c. As above	c. Advanced Standing with certificate	c. College degree	c. June	c. 22 mos.			
Richmond Professional Institute of the College of William and Mary	Miss H. Elizabeth Messick, O.T.R. Director, School of Occupational Therapy Richmond Professional Institute Richmond 20, Virginia	a. $230/acad. year $330 for out-of-state Freshman and Sophomore students $370 for out-of-state Junior, Senior and Graduate students $125 clinical affiliations	a. Degree (B.S. in O.T.)	a. As for the college; qualified transfer student	a. Sept.	a. 4 acad. yrs. plus 9 mos. clinical affiliations	Yes	Yes	88
		b. As above	b. Certificate	b. 1 year college (30 semester credits)	b. Sept.	b. 2 acad. yrs. plus 9 mos. clinical affiliations			
		c. As above	c. Advanced Standing (Certificate)	c. College degree	c. Sept.	c. 1 acad. yr. plus 9 mos. clinical affiliations			

Name of School	Name and Address of Director	Tuition	Type of Course	Entrance Requirements	Classes Start	Length of Course	Students M	Students F	Enrollments
Saint Catherine, College of	Sister Jeanne Marie, O.T.R. Director of Occupational Therapy The College of Saint Catherine St. Paul 1, Minnesota	$300/acad. year $30 clinical affiliations	Degree (B.S.)	*As for the college; qualified transfer student	Sept., Jan., March	4 acad. yrs. plus 9 mos. clinical affiliations	No	Yes	68
San Jose State College	Asst. Prof. Mary Booth, O.T.R., San Jose State College, San Jose 14, California	a. $45/acad. year $10 clinical affiliations b. As above	a. Degree (B.A.) b. Advanced Standing (Certificate)	a. As for college b. College degree	a. Oct., Jan., April b. As above	a. 4 acad. yrs. plus 9 mos. clinical affiliations b. Minimum 1 yr. acad. plus 9 mos. clinical affiliations	Yes	Yes	132
Southern California, University of College of Letters, Arts and Sciences	Miss Angeline A. Howard, O.T.R., Head of Department of Occupational Therapy, University of Southern California, Box 274, Los Angeles 7, California	a. $600-720/acad. year $75 clinical affiliations b. As above c. As above	a. Degree (B.S.) plus (Certificate) b. Advanced Standing Certificate c. Graduate (M.A.)	*a. As for the University b. College degree c. O.T.R. or eligible for O.T.R. with college degree, 1 yr. experience in O.T.	a. Sept., Feb., July b. As above c. Sept., Feb.	a. 4 acad. yrs. plus 9 mos. clinical affiliations b. 1 acad. yr. plus 9 mos. clinical affiliations c. 1 acad. yr.	Yes	Yes	126
Texas, University of Medical Branch	Mrs. Cynthia Schuleman, O.T.R., Director of Occupational Therapy, University of Texas, Medical Branch, Galveston, Texas	$50/acad. year $300 for out-of-state residents $25 clinical affiliations	Advanced Standing (Certificate)	College degree	Sept.	1 acad. yr. plus 9 mos. clinical affiliations	Yes	Yes	
Texas State College for Women	Assoc. Prof. Fanny B. Vanderkool, O.T.R. Director of Occupational Therapy Department Texas State College for Women Denton, Texas	a. $50/acad. year $150 for out-of state students b. As above	a. Degree (B.S. or B.A. with major in OT) b. Advanced Standing (Certificate)	a. As for the college b. College degree	a. Sept., Feb. b. Sept.	a. 4 acad. yrs. plus 9 mos. clinical affiliations b. 9 mos. on campus, 9 mos. clinical affiliations	No	Yes	75
U. S. Medical Service School of Occupational Therapy	Myra McDaniel, Major, WMSC (OT) Address Inquiries: The Surgeon General Department of the Army Washington 25, D. C. Attn.: Chief, Personnel Div.	None	Advanced	*College degree	Sept.	70 weeks	No	Yes	20
Washington University School of Medicine	Asst. Prof. Erna L. Simek, O.T.R. Director, Department of Occupational Therapy Washington University School of Medicine 4567 Scott Avenue St Louis 10, Missouri	a. $525/acad. year $100 clinical affiliations b. As above	a. Degree (B.S. in O.T.) b. Advanced Standing (Certificate)	a. 60 semesters college credits, 36 of which are in required subjects b. College degree	a. Sept. b. Sept.	a. 2 acad yrs. plus 10 mos. clinical affiliations b. 1 acad. yr. plus 10 mos. clinical affiliations	Yes	Yes	51

Name of School	Name and Address of Director	Tuition	Type of Course	Requirements Entrance	Classes Start	Length of Course	Students M	Students F	Enrollment
Wayne University College of Liberal Arts and College of Education	Asst. Prof. Barbara Jewett, O.T.R., Director of Occupational Therapy, Detroit Memorial Hospital, 1420 St. Antoine, Detroit 26, Michigan.	a. $195/acad. year $395 for out-of-state students $97.50 clinical affiliations $197.50 for out-of-tate students	a. Degree (B.S. in O.T.)	a. As for the University	a. Sept., Feb., June	a. 4 acad. yrs. plus 10 mos. clinical affiliations	Yes	Yes	96
		b. As above	b. Advanced Standing (Certificate)	*b. College degree	b. As above	b. 1 acad. yr. plus 10 mos. clinical affiliations			
Wisconsin, University of School of Medicine	Asst. Prof. Caroline G. Thompson, O.T.R., Director of Occupational Therapy, University of Wisconsin, 1300 University Avenue, Madison 6, Wisconsin	$180/acad. year $500 for out-of-state students	Degree (B.S. in O.T.) from School of Education plus Certificate from School of Medicine	As for the University	Sept , Feb., June	4 acad. years. plus 10 mos. clinical affiliations	Yes	Yes	170

The following schools have developed courses based on the essentials established by the Council on Medical Education and Hospitals of the American Medical Association. Accrediting of any course must await a period of probation. Status may therefore have changed subsequent to publication of this listing

Buffalo, University of School of Medicine	Asst. Prof. Nancie B. Greenman, O.T.R., Director of Program in Occupational Therapy, University of Buffalo, 2183 Main Street, Buffalo 14, New York	a. $600/acad. year $90 clinical affiliations	a. Degree (B.S. in O.T.) from School of Medicine	a. As for the University; qualified transfer student	a. Sept., Feb.	a. 4 acad. yrs. plus 9 mos. clinical affiliations	Yes	Yes	9
		b. As above	b. Advanced Standing (Certificate) from School of Medicine	b. College degree	b. Sept.	b. 1 acad. yr. plus 9 mos. clinical affiliations			
North Dakota, University of	Asst. Prof. Ione Olson, O.T.R., Director of Occupational Therapy Department, University of North Dakota, Grand Forks, North Dakota	$60/acad. year $113 for out-of-state residents	Degree (B.S. in O.T.)	As for the University; qualified transfer student	Sept., Feb.	a. 3½ acad. yrs. plus 9 mos. clinical affiliations	Yes	Yes	13

*Schools having additional requirements

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Staff occupational therapist for cerebral palsy department, N. Y. S. Rehabilitation Hospital, West Haverstraw, N. Y. Civil service position; New York State Department of Health; 40 hour week. Starting salary $3251. Contact Director, Dr. A. J. Canning.

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Supervisor of occupational therapy desired in outpatient rehabilitation center. Emphasis of service: A.D.L., kitchen activities, work evaluation and build-up program, functional crafts. Staff occupational therapy position also available. Write: Dr. K. C. Keeler, Director, The Rehabilitation Center of Summit County, Inc., 326 Locust Street, Akron 2, Ohio.

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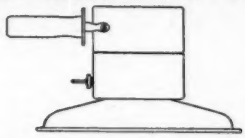

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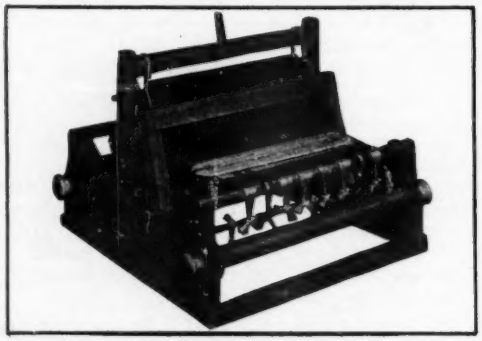

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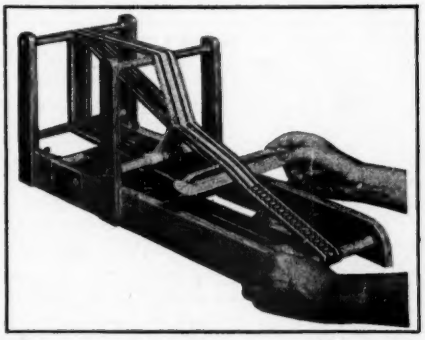

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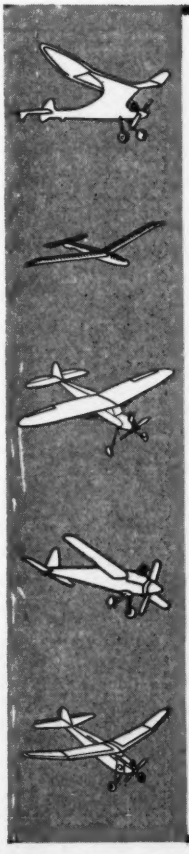

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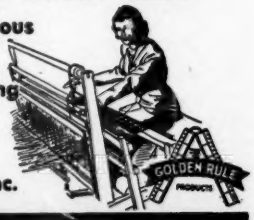

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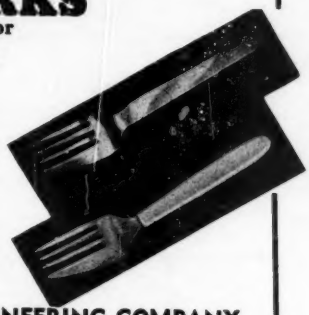

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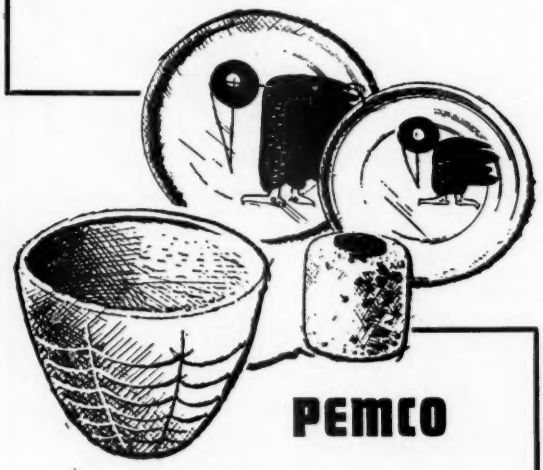

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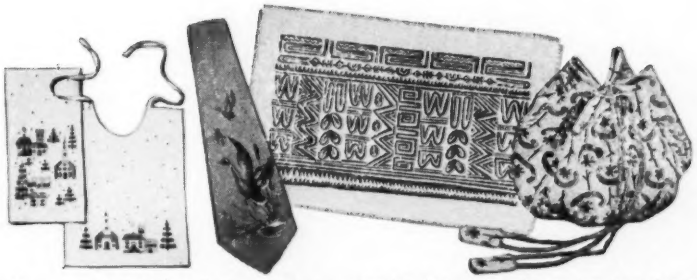

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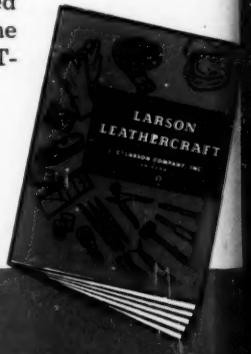

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